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LONDON, JANUARY 7, 1922.

EDINBURGH TRAMWAY ELECTRIFICATION.

Edinburgh Town Council have at length decided to proceed with the electrification of the tramways on the overhead system. It is the only course that commends itself to those conversant with the needs of the city. A controversy of unusual magnitude—even in municipal politics—has moved round the question since the Council in April, 1919, first decided that the cable system should be electrified; and of late the City's press has published a host of letters from advocates for and against the proposal. The problem as to the most suitable system to take the place of the present one was complicated by the fact that Princes Street, one of the most attractive thoroughfares in Europe, was involved. The conduit system naturally found its advocates, requiring, as it does, no overhead equipment, but the information obtained by the Tramways Committee led them, quite rightly, to reject this alternative. In view of the experience with the conduit systems in London and Brussels, there is no doubt that the overhead system is not only much more economical, but better adapted to the conditions in Edinburgh. Even though with the conduit method the change from this to the overhead and *vice versa* may not cause undue delay, there remains the disadvantage that extra equipment is required, as each car would need both the overhead trolley and the conduit plough, quite apart from the additional cost of operation. The general manager, who has now been in charge of the Edinburgh tramways for several years, has made a very thorough investigation of all systems. He has also gone into the alternative of omnibuses, and has, we think rightly, concluded that tramways are better adapted to the needs of the City. In this view Mr. Pilcher has the support of the convener of the Tramways Committee, Mr. Mancor, who told the Council that, while omnibuses had their place, the circumstances in Edinburgh were such as practically to put them out of the question. The advocates of the omnibus have certainly kept their case forcibly before the Council, but have failed to prove that these vehicles can be operated as economically as tramcars under present conditions. Though the costs of electric tramways have enormously increased since 1914, omnibus costs have risen in even greater ratio. Among the "opposition" at Edinburgh was a fairly large element who favoured postponement of the electrification plans until further information about other methods could be obtained. Mr. Mancor effectively replied that this would involve further useless expenditure on the cable system, which was bound to disappear sooner or later. But what seemed to carry the case for electrification was the prospective financial saving outlined in the City Chamberlain's report. It would have been hard indeed to resist the argument that between fifty and sixty thousand pounds, or twopence-halfpenny per car mile, would be saved in one year by the change. It had been said that the whole question really turned on the "fate" of Princes Street, and there was reason for solicitude for its future. Yet, after two and a half years' consideration of the matter, the Council cannot be far wrong in their ultimate conclusion that an electric system, with span wires, in this thoroughfare, is the best means of providing Edinburgh with an adequate transport service. After all, as was observed during the debate, "one cannot live on amenity."

SCARBOROUGH TRAMWAYS.

COMPANY'S SYSTEM TO CHANGE HANDS.

The service owned by the Scarborough Tramways Company, which was to have ceased permanently on December 31 last, has continued running, an offer to purchase the undertaking having been accepted by the management. This offer, which is subject to confirmation by the shareholders, came from a combination of London and Yorkshire engineers, with whom is associated Mr. H. Seaton, of the Yellow Motor Bus and Coach Service. Mr. Seaton will act as managing director.

It is understood that the intention of the new company is to exercise their right, under the statutory power possessed by the present company, to run an omnibus service in conjunction with the tramways to every part of the town.

On Monday last, Messrs. Seaton & Company ran a service of omnibuses to the South Cliff, while the Scarborough and District Motor Services (proprietors, Robinson's Motors, Ltd.) commenced running vehicles on the tramway and other routes, and also doubled their service to the South Cliff.

The Scarborough tramways were opened in 1904. The single track length is 7¾ miles, and the route length four miles. In summer the maximum number of cars (22) has been in use, but only six vehicles were found necessary in the winter. Mr. H. V. Moinet (general manager and electrical engineer) has attributed the failure of the company to make a profit to the inadequate length of the system, and its consequent inability to tap a sufficiently large area.

REPORT ON BURTON TRAMWAY ACCIDENT.

INSPECTOR AND THE QUALITY OF AXLE STEEL.

Burton-on-Trent Tramways Committee have issued the report of Major Mount, the Ministry of Transport's inspector, on the overturning of a tramcar in Station Street on November 3 (as reported in our issue of November 5). A number of passengers were injured, though not seriously. The report stated that when at the facing points leading from the single to the double line the leading wheels took the left-hand track and the trailing wheels followed the right-hand track. All the wheels finally left the rails on which they were travelling, and the car then skidded and overturned. The body and truck were not seriously damaged, but the trailing axle was broken. The motorman estimated his speed at nearer four than five miles an hour, but the inspector formed the opinion that it was probably six miles an hour. It was impossible to say definitely when the axle broke, but he was inclined to agree with the Corporation officials that the fracture took place at or just before the car reached the points.

Having referred to the bad record of axle fractures, to which the Corporation was fully alive, and the constant shocks received (as pointed out by the Corporation's electrical engineer, Mr. T. Hall) during the passage of cars over the street railway crossings, the inspector said it was clear that either the efficiency of manipulation in regard to the speed in which cars are being driven in Burton had depreciated since the war, or else axle material was not as good as it used to be. It was evident there was a tendency to exceed the permissible speed limit. It was important that restrictions through junctions, round curves, and over level crossings should be strictly observed by the inspection staff, not only in the interests of safety, but having regard to the maintenance of rolling stock. His opinion was that even though derailed, the car would not have overturned had the speed through the junction not exceeded four miles an hour. As to the quality of the axle steel, the inspector thought that having regard to the pre-war record of failures, it must be admitted that the material was not so good as it used to be, and the Corporation

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would be well advised to pay particular attention to this important question from the safety point of view. It would be advisable to insist upon, and, if necessary, in the case of small orders, to pay for the usual tests before purchase, and in this connection the inspector drew attention to the British Engineering Standard Association's recent specification for tramway axles (August, 1921).

The Tramways Committee have informed the Minister of Transport that the question of broken axles was receiving careful consideration, and that steps were being taken to ensure that motormen did not exceed the maximum speeds authorised.

MISCELLANEOUS NEWS AND NOTES.

Penny Fares at Hastings.—Penny minimum fares will shortly be reintroduced by the Hastings Tramways Company.

No Fare Reductions at Birmingham.—Birmingham Tramways Committee cannot see their way to recommend any reduction in fares at present.

Proposed Penny Fares at Derby.—Derby Tramways Committee has been requested by the Town Council to consider the advisability of adopting penny fares.

Croydon Corporation has received the sanction of the Electricity Commissioners for the expenditure of £500,000 on the provision of new sub-station buildings and equipment, cooling towers, etc.

The London, Brighton and South Coast Railway Company have deposited a Bill in Parliament in which powers are sought to raise funds by the issue of debenture stock for the electrification of additional suburban lines.

Economy Sought at Accrington.—The Corporation tramways manager (Mr. H. Pilling) has been asked by the Council to report as to what economies can be effected in the tramway service so as to diminish the present loss.

Light Railways Order.—The Minister of Transport has recently confirmed the Totton Hythe and Fawley Light Railway Order, 1921, authorising the construction of a light railway from Totton to Fawley in the County of Southampton.

Tramway Improvement at Hull.—The Tramways Committee of Hull Corporation have approved a scheme for a loop line through Anne Street and Osborne Street to relieve the traffic at Midland Street corner. The estimated cost is £6,000.

Parcels by Omnibus at Hull.—Hull Corporation have decided to carry parcels on omnibuses, and have fixed the following maximum charges: 3d. for parcels weighing not more than 7 lbs., and 1d. for every additional 7 lbs. up to a maximum of 28 lbs.

Wallasey Reverts to Penny Fares.—Wallasey Borough Council have agreed to the reintroduction of penny stages, and the substitution of a discount of 2d. in the shilling on prepaid tickets, in place of the present plan of selling 13 tickets for a shilling.

Penny Fares in Operation at Brighton.—Penny minimum fares came into operation on the Brighton Corporation tramways on January 1. The stages are practically the same as those which existed during the previous trial of penny fares early in 1921.

Tramway Employees' Pay for December 27.—The Lancashire and Cheshire Tramways Authorities' Council, unanimously decided to recommend all tramway authorities in their area to pay the ordinary time rate only to employees employed on December 27 last.

London General Omnibus Company and Tramway Fares.—It is reported that the London General Omnibus Company has formally arranged with some of the outlying tramways in the Metropolitan district not to reduce fares without consultation between themselves and the L.G.O.C.

Privately-Owned Wagons.—The Minister of Transport gives notice that the register of privately owned wagons, instituted in accordance with the terms of the announcement of February 12, 1920, will be closed, and no orders for wagons placed after January 7, 1922, will be registered by the Ministry of Transport.

Institution of Electrical Engineers.—In the theatre of the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, W.C.1, on Thursday, January 12, at 6 p.m., there will be an exhibition of cinematograph films, including investigations and tests of high-tension switch gear by Mr. P. Torchio, with explanatory notes by Mr. C. C. Garrard.

Compulsory Rear Lights.—South Shields Corporation has received a communication from the Ministry of Transport stating that certain recommendations of the Departmental Committee on Lights on Vehicles are at present before the Government, and the suggested compulsory use of a red rear light on vehicles will probably be embodied in a Bill.

Cheap Omnibus Fares for London Children.—On New Year's Day the London General Omnibus Company inaugurated cheap fares for children under 14 years of age. For ordinary stages up to and including 2d. the charge for a child is 1d.; for 3d. and 4d. stages it is 2d., and for longer stages, half-price. This does not apply to the cheap mid-day fares.

South African Railway Electrification.—The Government have begun the electrification of the Pietermaritzburg-Glencoe line, an important section passing through the colliery district of Natal. The route presents some steep gradients and in one section in a distance of 12 miles it rises about 1,500 ft. The generating station is being erected at Glencoe.

Underground Stamps.—The Underground is now using a gummed stamp for correspondence on the familiar lines of the larger stamps affixed to its public announcements. These stamps are effectively printed in six colours, and are used with the company's public correspondence as a reminder to the public that the London Underground is part and parcel of London's daily life.

Another Tramwayman's Record.—An employee on the Guernsey tramways, Mr. W. Bloomfield, has now been given an indoor post after 42 years' service. He has never been late. (In our last issue we recorded the fact that a Manchester Corporation motorman has retired after 41 years' service. He, too, was always punctual.)

Transport Ministry Bans "Reversed" Stairs.—The Ministry of Transport has informed Burnley Corporation that the Ministry has decided not to approve the construction of the "reversed" type of staircase in double-decked tramcars in future. The chairman of the Tramways Committee, vice-chairman, and the general manager have been authorised to interview the Ministry of Transport on the matter.

Huddersfield-Brighouse Tramway Extension.—The borough treasurer has submitted a report to the Huddersfield Town Council which showed that the estimated cost of the permanent way for the Brighouse tramway extension was £74,000. The cost of the cars and overhead equipment was estimated at £17,500. The extension was approved subject to financial assistance being obtained from the Government.

I.O.M. Tramway to Change Hands.—At the annual meeting of the Douglas Southern Electric Tramways, Ltd., held at Manchester on December 29, it was reported that during the past year an agreement was entered into with the Douglas Head Marine Drive Company, Ltd., by virtue of which, at the end of the Concession in 1926, the Drive Company will take over the tramways as a going concern, paying therefor the agreed or arbitrated value of the company's mechanical and electrical plant and half of the value of the permanent way.

What Taunton Thought of Its Tramways.—In a local review of the year 1921 the *Somerset County Gazette* published at Taunton, alludes to the "reverse in the matter of public convenience" occasioned by the withdrawal of the tramway service of the Taunton Electric Traction Company, on May 28 last. "Public feeling has been strong on the loss of the service," the journal says, "the more so as the introduction of the necessarily limited National Omnibus Company's service has not proved anything like so useful as the trams were to the public."

Geddes Committee and Tramcar Renovation.—It is reported that the Geddes Economy Committee regards as unnecessary the rule that requires London tramcars to be painted and varnished before the annual renewal of the licences. By reducing the frequency of the renewal of paint and varnish to once in 21 months it is calculated that £35,000 a year would be saved in the case of labour alone, and a capital sum of £175,000 by a consequent reduction in the number of cars required for the service. Three-and-a-half per cent. more cars would be freed for work.

Increased Fares in Paris.—Tramway and omnibus fares in Paris will be increased on January 22. Hitherto all distances within Paris have been divided into three sections, the second-class fare for the section being 25 centimes and two or more sections 35 centimes The corresponding first-class fares have been 35 and 50 cents. respectively. The new scale provides for a second-class fare of 25 cents. for the first section, 40 cents. for the second, and an additional 10 cents. for the third section (plus another 10 cents. for the fourth where it exists). The corresponding first-class fares will be 40, 55, and 15 cents. respectively.

Scottish Tramway Officials' Association.—At a meeting held at the tramway offices in Glasgow on December 16, Mr. James Dalrymple in the chair, it was agreed, at the request of the committee of the "A" Scotland district area, to broaden the membership so as to admit the chairmen of municipal tramway committees and the directors of company undertakings, and to alter the name to the Scottish Tramways Association. A small committee was appointed to draw up a constitution, and the present office bearers will in the meantime hold office. Mr. Fred Coutts, engineer and general manager of the Paisley District Tramways Company, is honorary secretary.

More Standing Passengers at Leeds.—At Leeds City Council on Wednesday, a resolution was carried that 12 persons—instead of 8 as at present—in excess of the seating capacity be allowed to stand inside the tramcars. Alderman R. A. Smithson (chairman of the Tramways Committee) said the object was to regularise a practice that was already fairly general. Some conductors now filled their cars at rush times, while others adhered to the regulations and allowed only eight excess passengers. The resolution would remove misunderstanding. He repudiated the suggestion that any of the Leeds cars were unsafe. From the accident point of view Leeds tramcars had the lowest possible average of costs in respect of accidents.

Tramway Development Scheme at Aberdeen.—The Corporation, in a Draft Provisional Order, seek powers to construct additional tramways, a new street or road, and to borrow further money for street works and the extension of the Esplanade, and for the tramway and gas undertakings. It is pointed out that the Corporation, having acquired the lands known as the Hazelhead estate, adjacent to the city, find it expedient to extend the tramway service from Rubislaw terminus to the Hazelhead estate. The new undertakings are estimated to cost £620,000, of which £174,500 will be expended on the construction of the tramways and tram road, the acquisition of lands, and electrical equipment; £170,000 for the erection of buildings and plant for gas works purposes; £30,000 in connection with the provision and running of omnibuses; £50,000 for the construction of buildings in connection with the tramway undertaking; £50,000 for repairing and recausewaying existing streets and laying out new streets within the city; and £39,000 for the extension of the Esplanade.

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Glasgow Tramway Developments.—Glasgow Corporation is seeking power, through a Draft Provisional Order (as was reported in our issue of November 26 last) to construct new tramways and tramroads in connection with the existing tramway system, and to operate motor omnibuses within and outside the city. The estimated cost of construction of the new tramways, tram roads, and street works is £334,689, the erection of electrical equipment £87,988, and the provision of omnibuses £100,000. In addition, £17,000 is estimated as the purchase price of lands necessary in connection with the scheme. The new undertakings are expected to be completed within five years of the passing of Act confirming the Order.

Glasgow Tramway Purchase Ratified.—The town councils of Coatbridge and Airdrie have signed the agreement by which Glasgow Corporation purchases the tramway system of the two burghs (as reported in our issue of December 17). The purchase price is £82,250. The present track extends a distance of 3½ miles. With the transference of the management to the Glasgow Corporation (whose tramway manager is Mr. J. Dalrymple), the fares have been revised and new ones came into operation on January 1. The minimum is 1d., and the charge for the whole journey is 4d. Instead of the former practice of issuing workmen's tickets for the return trip only, single tickets for the entire route are now issued at 2d. (4d. return).

Hull Watch Committee and Omnibus Licences.—At Hull Watch Committee the Chief Constable submitted an application from the general manager of the Grimsby Street Tramway Company on behalf of the Provincial Tramway Company, Limited, for two hackney carriage licences in respect of two 31-seater corridor motor coaches. The application stated that these would only be used during the summer months for pleasure parties for half and full day tours from Hull, and would not be run in competition with existing local services from Hull. The Chief Constable reported the result of enquiries as to the practice followed in other districts with regard to allowing omnibuses from outside to ply for hire. The application was granted.

Japanese Mission and London Transport.—The members of the Japanese Commercial Mission who have been visiting Great Britain, made a special study of transport organisation in London. One day last week they were entertained by the management of the Underground railway companies, who arranged tours of inspection of the railway system, Lots Road power station (Chelsea), and of the organisation which controls the omnibus services. On another day the London County Council gave the visitors an insight into some of the municipal services, including the tramways. They were shown over the main power station at Greenwich, and also the central car-repairing depot. The members of the Mission were immensely impressed by all they saw on both days.

Transfer of Bootle Electricity Undertaking.—Bootle Corporation on Wednesday resolved to transfer the borough electricity undertaking to Liverpool Corporation. The agreement provides that the transfer would be effected, if consent of the central authority is obtained, on April 1, and would come into full operation on July 1. Liverpool would take over the whole assets, except the Pine Grove generating station (now converted into a garage), and the whole of the liabilities, and pay Bootle annually in relief of rates £7,500. Liverpool Corporation have confirmed the transfer and also that of the undertaking of the Liverpool District Lighting Co., Ltd., which supplies Waterloo-with-Seaforth and Great Crosby with electricity. The consideration is an annual payment of £4,000, with a right to commute.

Salford Corporation and Tramway Competition.—Salford Corporation has adopted the following resolution, which was submitted by the Tramways Committee, on the lines of the resolution passed at the annual conference of the Municipal Tramways Association at Salford in September:—Resolved by this committee that the Road Act of 1920 promotes and encourages unfair competition with statutory undertakings catering for road passenger transport, and that in the interests of the tramway undertaking, the statutory regulation of such competing services should be undertaken as early as possible, and that a copy of this resolution be forwarded to the Ministry of Transport and to the members of Parliament for Salford, urging them to initiate and support the action necessary to realise the objects set out in the resolution.

PERSONAL.

Mr. Walter Rutherford has joined the board of G. D. Peters and Company, Ltd.

Mr. Lionel Jenkins has been recommended for the appointment of borough engineer and surveyor to Newport Corporation. Mr. Jenkins carried out the construction of the Middlesex light railway and tramway system. He saw active service during the war, and was mentioned in despatches.

Mr. F. Schofield, formerly manager of Leyton District Council Tramways (which are now worked by London County Council), has been presented with a gold watch and curb chain as a farewell gift, by members of the Leyton Council and Mr. Schofield's late colleagues. Mr. Schofield now holds an appointment on the staff of the L.C.C. tramways.

Mr. Ernest Holt, who for the past nine years had been general manager of Ashton-under-Lyne Corporation Tramways, died on Monday at the age of 38. He went to Ashton as chief tramways clerk from Halifax in 1905, and succeeded Mr. Dugdale as manager in 1912. Under Mr. Holt's management the borough tramways have been completely reorganised.

NEW YEAR HONOURS.

Sir John Jarvis, who has received the honour of a baronetcy, is chairman of John Jarvis & Son, Ltd., and is a director of the National Omnibus Co., Ltd. During the war he rendered great service to the Government. When Mr. Lloyd George was Minister of Munitions, Mr. Jarvis received an important appointment which he held until the end of the war, refusing all offers of remuneration. His co-operation was specially valuable in dealing with trade disputes and labour difficulties.

His Majesty has conferred a peerage of the United Kingdom on **Mr. Joseph Watson,** a director of the Lancashire and Yorkshire Railway Company, and chairman of Messrs. Joseph Watson & Sons. During the war Mr. Watson rendered signal service to the country in organising filling factories. He has been a generous contributor to various philanthropic institutions. A baronetcy has been conferred on **Mr. Hugh Reid, I.L.D.,** chief managing director and deputy chairman of the North British Locomotive Company. Among the new knights is **Mr. Albert John Hobson,** chairman of William Jessop & Son, Thomas Turner & Company, vice-chairman of the High Speed Steel Alloys Co., and a director of the Birmingham Small Arms Company.

Sir John Timpson, K.B.E.—The inclusion of Councillor John Timpson, deputy mayor of Portsmouth and chairman of the Portsmouth Corporation Tramways Committee, in the list of New Year Honours, is specially gratifying to his friends in the tramway industry. Councillor Timpson thrice filled the mayoral and other civic offices with much credit. He represented the Corporation during the important years following the war, one of his duties being to announce from the Town Hall the signing of the Armistice. He received many distinguished visitors, and among his guests at Portsmouth from time to time have been the officers and men of the Brazilian squadron and the Japanese squadron. He received the Crown Prince of Japan, and the Prince of Wales on his return from Canada and America in December, 1919, and again in October, 1920, on the Prince's return from Australia. During the war he raised £850,000 for the last Victory loan, and concluded three years of energetic work by seeing the war memorial through to its completion. For this scheme, including £10,000 set apart for the hospital, he raised over £30,000. As chairman of the Portsmouth Corporation tramways, he has for many years taken a prominent part in the industry, and in 1920 he was appointed a member of the Council of the Municipal Tramways Association, and at the Salford Conference last September he was elected vice-president.

FINANCIAL.

J. Brockhouse & Company, Ltd., have paid an interim dividend of 5 per cent. (1s. per share) free of tax on the ordinary shares.

Halifax Tramways' Position.—There was a profit of £3,966 on the working of Halifax Corporation tramways for the seven months ended October 31, 1921.

London and Suburban Traction Group.—The receipts for the week ended December 31 were £45,548 (previous week £51,072). The aggregate from January 1 to date amounts to £2,826,535.

London Underground Group Receipts.—The receipts of the Common Fund Companies for the week ended December 31 amounted to £192,964 (previous week £232,609). The aggregate from January 1 to date is £12,233,340.

Leyland Motors, Ltd.—The directors of Leyland Motors, Ltd. have announced that it is impossible for them to consider at present the payment of dividends on the 6 per cent. and the 7½ per cent. preference shares.

Fodens, Ltd.—The directors have announced that they are unable to recommend the payment of an interim dividend. In common with all industrial concerns the company is suffering from trade depression, and the directors deem it wise to maintain their reserves.

New South Wales Tramways.—The report of the Railway Commissioners for New South Wales on the working of the railways and tramways for the quarter ended September 30 last gives the following figures in respect of the tramways: Revenue, £860,142, an increase of £101,203; expenditure, £706,336, an increase of £82,517; percentage of expenditure to earnings, 82.12, an increase of 0.08.

Douglas Southern Electric Tramways, Ltd.—The annual report states that the season was a comparatively short one owing to the miners' strike, with the consequent loss of Whit-week and practically the whole of June traffic. There was a decrease in the total receipts (less tolls) of £3,700. The net profit was £2,425 (a decrease of £3,599), to which is added £1,568 brought forward from last year, giving an available total of £3,994. The directors recommend a 7 per cent. dividend on preference shares, less income tax, and a 5 per cent. dividend on the ordinary shares, less income tax, and that the balance of £1,402 be carried forward. (A reference to the proposed sale of the undertaking will be found in another column.)

Isle of Thanet Electric Tramways and Lighting Co., Ltd.—The report for the year ended September 30 last shows that the balance of profit compared with the previous year, is £696 lower at £31,448, but the total receipts amount to £105,628, against £97,244. Traffic receipts show a slight increase at £75,481, and £28,598 has been derived from the sale of electricity, compared with £22,626 for 1919-20. Allocations to the various reserve funds total £16,078, against £20,000, while the amount written off the cost of motor vehicles is £352 greater at £864 than that so applied in the previous year. A half-year's dividend, due in July, 1908, was paid on the preference shares in November last, leaving a considerable amount still in arrear. Allowing for this distribution, the amount carried forward is £3,972, against £4,284.

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L.C.C. Traffic Receipts.—The traffic receipts for the week ended January 4 amounted to £88,450, a decrease of £15,944 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year) to January 4 (40 weeks) the total receipts were £3,962,287, an increase of £289,570 on the corresponding period of 1920. The returns for the past nine weeks, compared with the corresponding period of last year, are given below :—

Week ended	Receipts 1921	Inc. or dec. on previous week.	Receipts 1920	Inc. or dec. on last year.
	£	£	£	£
November 9	99,103	— 2,655	97,897	+ 1,206
November 16	95,901	— 3,203	104,700	— 8,799
November 23	97,734	+ 1,833	99,033	— 1,299
November 30	91,563	— 6,171	101,402	— 9,839
December 7	89,800	— 1,763	102,133	—12,333
December 14 ..	92,816	+ 3,016	96,756	— 3,940
December 21	97,508	+ 4,782	105,339	— 7,741
December 28	85,959	—11,639	94,529	— 8,570
January 4	88,450	+ 2,491	104,394	—15,944

Penny fares were re-introduced on December 1.

CONTRACTS.

Liverpool.—The following tenders have been accepted :—1,000 tons of steel tramway rails, Leeds Steel Works ; 30 tons of fishplates, Guest, Keen and Nettlefolds ; 60 tons of steel tie-bars, Hadfields, Ltd. ; 6 tons of steel fishplates, Horton & Son, Ltd. ; 4,850 copper bonds, The British Insulated and Helsby Cables, Ltd.

New Trucks and Equipments for Edinburgh.—The Edinburgh Town Council have accepted the tender of the Peckham Truck and Engineering Company, Ltd., of Audrey House, Ely Place, London, E.C.1, for fifty-three pendulum trucks. These trucks will be constructed for the Peckham Company by the Brush Electrical and Engineering Company, Ltd., of Loughborough. The cars for which these trucks are required will be equipped with motors, controllers and magnetic track brakes made by the Metropolitan-Vickers Electrical Company, Ltd., of Manchester.

BUSINESS NOTES.

Baldwins Purchase the Eagle Tinplate Works.—It is officially announced that the purchase of the Eagle Tinplate Works, Neath, by Baldwins has been completed. The works are the best in the country.

The British Petrol and Motor Equipment Company, Ltd., has been registered with a nominal capital of £100,000 in £1 shares, to take over the business carried on by the Petrol Users' Society, Ltd. The registered offices are at 3, Copthall Buildings, Copthall Avenue, London, E.C.

Hydro-Electric Plant for New Zealand.—A Reuter's message reports that the New Zealand Government has accepted tenders from British firms for £100,000 worth of plant for a hydro-electric power station to supply Wellington and district. Mr. Massey, the Prime Minister, states that further tenders are under consideration. American and Swedish firms competed.

Ransomes, Sims & Jefferies, Ltd., of Orwell Works, Ipswich, have been appointed sole manufacturers and licensees in the United Kingdom, the Colonies and Dependencies, South America, the Dutch Indies, and China, for the Kestner water-tube boiler. This type of boiler has been a great success in France, where it is manufactured by Schneider & Co., and is in use in many large municipal power stations.

Leo Swain and Company, Ltd., of 280, Deansgate, Manchester, are sole concessionaires for the North of England and Wales in Continental cross-ribbed cord tyres. These tyres are of special construction, each strand of the cords being embedded in rubber. This, it is claimed, reduces all possibility of friction, and consequently obviates overheating. The tyre is estremely pliable and absorbs a high percentage of road shocks, thus increasing comfort of travel.

METAL PRICES.*

		Price on January 5.	Price on December 29.
COPPER.			
Best Selected	per ton	£68 10s.	£68 15s.
Electro Wirebars	per ton	£74 10s.	£75
H.C. Wire, basis	per lb.	11¾d.	11¾d.
Sheet	per lb.	10¾d.	10¾d.
PHOSPHOR BRONZE WIRE (Telephone).			
Phosphor Bronze Wire, basis ...	per lb.	1s. 3¼d.	1s. 3¼d.
BRASS 60/40.			
Rod, basis	per lb.	7¾d.	7¾d.
Sheet "	per lb.	10¾d.	10¾d.
Wire "	per lb.	11¼d.	11¼d.
PIG IRON.			
Cleveland Warrants	per ton	£5 5s	£5 5s.
Galvanised Steel Wire, basis 8 S W.G.	per ton	£22	£22
LEAD PIG.			
English	per ton	£26	£26
Foreign or Colonial	per ton	£24 5s.	£24 10s.
TIN.			
Ingot	per ton	£167 15s.	£172 7s. 6d.
Wire, basis	per lb.	2s. 3¾d.	2s. 3¾d.

* Supplied by the British Insulated and Helsby Cables, Ltd.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1920.	1921.	+ or —	AGGREGATE. Wks.	1921.	+ or —
Aberdeen Corporation	Dec. 28	3,692	3,428	— 264	30½	110,560	— 9,459
" Motor Buses	" 28	..	123	..	30½	8,050	+ 7,295
Ayr Corporation ..	" 31	572	513	— 59	33	25,777	— 1,441
Barrow Corporation ..	" 31	933	731	— 202	39	33,754	— 1,754
Belfast City	" 30	9,242	12,083	+ 2,841	39	493,954	+ 45,737
Birkenhead Corporation	Jan. 1	2,786	2,679	— 107	38½	103,264	— 11,970
" Motor Buses	" 1	399	626	+ 227	38½	27,284	+ 10,766
Birmingham Corporat'n	Dec. 24	30,473	32,030	+ 1,557	38	1,125,276	— 79,928
" Motor Buses	" 24	1,667	1,868	+ 201	38	77,692	+ 59
Blackburn Corporation	" 28	2,710	2,708	— 2	39½	95,610	— 8,017
Bradford Corporation..	" 31	15,443	12,862	— 2,581	39	539,384	+ 18,697
Burnley Corporation ..	" 31	3,837	3,627	— 210	..	..	..
Burton-on-Trent Corp.	Jan. 1	724	632	— 92	39	24,800	+ 910
Bury Corporation ..	" 1	2,639	2,524	— 115	39½	97,355	— 3,278
Chatham & District ..	Dec. 15	1,455	1,538	— 83	50	83,011	— 3,468
Chesterfield Corporat'n.	" 26	622	607	— 15	39	22,980	+ 38
" Motor Buses	" 26	869	860	— 9	39	30,332	— 518
Derby Corporation ..	" 31	2,612	2,131	— 481	39	85,215	— 4,897
Dundee City ..	" 28	3,229	3,228	— 1	32½	105,911	+ 7,382
East Ham Corporation	" 31	2,083	1,951	— 132	39½	83,427	+ 2,963
Edinburgh Corp. Trys.	" 24	..	12,300	..	32	416,032	+ 13,611
" Motor Buses	" 24	..	3,404	..	32	116,783	..
Glasgow Corporation ..	" 31	47,031	45,347	— 1,684	30½	1,399,986	+ 27,329
Glossop (U.E. Sup. Co.)	" 31	286	278	— 8	52	12,635	+ 64
Halifax Corporation ..	" 27	4,276	4,570	+ 294	37½	170,522	+ 5,176
" Motor Buses	" 27	115	77	— 38	37½	3,090	— 1,215
" Railless Cars	" 27	..	62	..	23	1,324	..
Huddersfield Corporatn.	" 31	6,065	* 5,100	— 965	40	209,956	+ 11,434
Ilford U.D. Council ..	" 31	1,412	1,363	— 49	39½	59,573	+ 8,091
Ipswich Corporation ...	" 31	968	768	— 200	39	34,539	— 4,325
Isle of Thanet ..	" 28	653	657	+ 4	12	8,625	+ 1,228
Kilmarnock Corporat'n	" 31	421	381	— 40	32½	12,035	— 71
Leicester Corporation..	" 31	7,095	6,754	— 341	52	345,971	+ 2,384
Liverpool Corporation	" 31	26,454	28,763	+ 2,309	52½	1,522,028	+ 101,952
London County Ccl. ..	Jan. 4	104,394	88,450	— 15,944	40	3,962,287	+ 289,570
Maidstone Corporation	Dec. 29	449	446	— 3	38	18,902	— 308
Manchester Corp. ..	" 31	37,598	34,222	— 3,376	39	1,532,298	+ 199,007
Newcastle-on-T. Corp.	" 24	11,107	11,834	+ 727	38	436,122	+ 14,691
Nottingham Corp. ..	" 29	6,924	7,433	+ 509	39	263,860	— 39,318
Oldham Corporation ...	Jan. 1	4,733	4,845	+ 112	41	194,775	+ 4,542
Preston Corporation ...	Dec. 28	1,956	2,134	+ 178	38½	74,892	+ 4,483
Reading Corporation ...	" 29	1,618	1,778	+ 160	39	62,566	— 2,764
" Motor Buses	" 29	304	373	+ 69	39	13,535	+ 3,215
Rotherham Corporation	" 26	2,605	2,402	— 203	38	86,198	— 14,987
Sheffield Corporation..	Jan. 2	21,276	19,425	— 1 851	39½	772,264	— 50,608
Southampton Corp. ..	Dec. 28	2,955	2,957	+ 2	39	116,083	— 7,266
" Motor Buses	" 28	330	98	— 232	39	6,322	— 3,248
Southend-on-Sea Corp.	" 28	1,610	2,014	+ 404	39	101,494	+ 6,238
South Shields Corp. ..	" 24	1,660	1,896	+ 236	39	65,666	— 8,970
St. Helens Corporation	" 27	2,075	1,816	— 259	39	68,316	— 12,947
Sunderland Corp. ..	Jan. 1	3,068	2,681	— 387	39	104,028	— 17,562
Swindon Corporation..	Dec. 28	415	416	+ 1	38½	15,646	+ 445
Tyneside Trys., Trds...	" 21	1,200	908	— 292	25	27,248	— 4,947
Wallasey Corp. ..	" 31	2,862	2,642	— 220	39½	111,518	+ 8,724
" Motor Buses	" 31	140	231	+ 91	39½	9,530	+ 2,648
Walsall Corporation ..	" 31	2,344	1,656	— 688	40	65,008	— 5,453
" Motor Buses	" 31	1,728	1,035	— 693	40	37,110	— 8,041
Walthamstow U.D.C....	" 31	2,194	1,762	— 432	39½	82,309	+ 1,235
Warrington Corp. ..	" 29	952	1,143	+ 191	39	38,814	— 46
West Ham Corp. ..	" 29	6,142	5,802	— 340	39	232,414	+ 7,767
Wolverhampton Corp.	Jan. 4	2,438	2,287	— 151	40	94,188	— 3,373
" Motor Buses	" 4	579	655	+ 76	40	26,285	+ 8,791

* Includes Motor Omnibus receipts for 1921.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1919-20.	1920-21.	Wks.	AGGREGATE. 1920-21.	In. or Dec.
Anglo-Argentine ..	Dec. 31	£96,157	97,287	52	£4,203,364	+ £188,604
Ballarat & Ben. (4 wks.)	Oct. 9	4,442	4,682	28	30,388	+ 2,198
Brazilian Traction (Mlrs)	Nov.	12,199,000	14,555,000	48	155,462,000	+ 33,156,000
Brisbane	Oct.	46,310	47,880	44	471,920	+ 12,590
British Columbia $	Oct.	835,054	845,973	18	3,375,467	+ 134,606
Buenos Aires Lacroze ..	Nov.	56,746	58,056	21	280,238	+ 6,810
Burmah Tr. & Lght. Rs.	Nov.	53,696	58,271	17	237,191	+ 28,934
Calcutta .. Rs.	Dec. 31	90,561	83,588	52	4,021,233	— 818,256
Cape Town	Nov.	25,628	27,004	..	..	..
Carthagena & Herrerias	Dec.	5,560	3,237	52	31,052	— 19,305
Cordoba	Oct.	19,627	23,203	31	162,653	+ 22,646
East India	Nov.	4,234	3,945	16	16,696	— 174
Kalgoorlie ..	Sept.	3,301	2,829	39	20,119	— 7,490
La Plata	Nov.	5,573	6,453	48	58,098	— 3,652
Madras (2 weeks) Rs.	Nov. 30	42,446	43,605	44	915,870	— 172,416
Manila .. .. $	Nov.	320,345	306,850	48	3,364,545	+ 206,755
Montevideo	Nov.	43,846	47,426	4	47,426	+ 3,580
Para	Nov.	24,273	23,147	52	287,814	— 9,084
Pernambuco	Jan. 1	4,875	4,022	52	195,174	..
Port Elizabeth	Nov.	6,620	6,828	..	..	..
Rangoon .. Rs.	Oct.	111,830	151,000	44	1,845,301	+ 170,016
Shanghai .. $	Nov.	161,314	184,850	48	1,855,888	+ 189,000
Singapore .. $	Oct. 22	16,401	14,533	43	556,906	— 338,040
Toronto .. .. $	July	1,189,315	1,229,483	30	8,877,669	+ 642,006
Winnipeg .. $	Oct.	444,899	441,815	44	4,433,091	+ 156,543

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THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

LONDON, JANUARY 14, 1922.

THE "A.B.C." OF LOCAL TRAVEL.

The rapidly growing circulation of that useful guide to local travel known as "T.B.R." (Travel by Road) should not escape the attention of tramway managers. This new directory of local services is unfortunately confined at present almost exclusively to omnibus and motor coach services, but its value to the public would be increased by the inclusion of tramway services, whose owners would also greatly profit by the publicity they would thus obtain. At present anyone consulting the book in order to ascertain the best way to reach a certain point in or near a town which he is visiting or about to visit would probably be led to make his local journeys by motor omnibus rather than by tramcar. The new guide, now in its eighth number, may be briefly described as the A.B.C. of local travel. Its aim is to give in a conveniently indexed form a complete directory of all passenger-carrying road services in England and Wales, with routes and the time occupied by journeys, fares, and other details. Numerous maps of the districts served by various omnibus companies enable the prospective traveller to take his bearings at a glance. If particulars of tramway services and corresponding maps were embodied little would be wanting to make it a complete guide to all forms of public road services. The great convenience of such a reference book has been abundantly proved by the popularity that "T.B.R." has attained within a few months. Its utility is beyond question. Take for instance the case of a resident or a traveller arriving at a railway station who has to make his way to some unfamiliar or outlying district. A haphazard inquiry often fails to elicit information as to the most direct route, and valuable time is often wasted. With the help of a pocket guide to all local services questions could be quickly decided. There is the further advantage that the traveller could by these means map out a circular or alternative route for his return, facilitating business calls elsewhere. To tourists and pleasure seekers the opportunity to acquire easily all desired information with regard to local travelling will also be found exceedingly useful. The fact that some such guide is regarded by many tramway managers as a necessary adjunct to their system is proved by the number of local route maps, with service information, that are already published. These are excellent in themselves and no doubt partially fulfil their purpose, but they cannot take the place of a national guide, for they are not usually available outside the local area and their existence is very often not known to the visitor. Such considerations apply particularly to London and great provincial centres where there is a large floating population. The remarkable success of the London Underground in developing traffic by means of maps and other forms of publicity should encourage tramway managers to use every opportunity to make their systems and facilities better known to the public. Unacquaintance with local services is very much greater than is often supposed, and those who are responsible for the development of traffic cannot afford in these days of growing competition to neglect any opportunity of making their services better known to the public. Expenditure thus incurred will in the long run prove a good investment.

GAINS AND LOSSES OF MUNICIPAL TRAMWAYS.

RESULTS FOR THE YEAR, 1921-22.

For the thirty-seventh year Mr. W. Allison Davies, borough treasurer of Preston, has issued his very useful annual return showing rates levied in various towns, together with charges for gas, water and electricity for household purposes, and the profits and losses on municipal undertakings by which the rates have been reduced or increased. The profits transferred from industrial undertakings in relief of rates and losses in respect of which a rate in aid is levied are also given. The following are the estimated amounts transferred from the tramway undertakings in relief of rates and transferred from the rates to tramway undertakings. In 38 towns the tramways have received aid from the rates, while in nine towns contributions have been made by the tramways to the rates. In the previous year 16 towns received aid and 16 tramways afforded assistance to the rates.

TRAMWAYS SUBSIDISED FROM RATES.

	£		£
BACUP	1,001	GLOUCESTER	6,600
BARKING TOWN	7,500	HYDE	750
BARROW-IN-FURNESS	14,000	IPSWICH	10,900
BIRMINGHAM	10,000	LANCASTER	5,319
BOOTLE	445	LEYTON	28,535
BURNLEY	23,477	MOSSLEY	750
BURTON-UPON-TRENT	7,418	NORTHAMPTON	3,970
BURY	13,000	OSSETT	325
COLCHESTER	3,200	PRESTON	6,500
COLNE	2,940	RAWTENSTALL	1,500
COVENTRY	10,250	READING	14,023
DARLINGTON	3,166	ROCHDALE	1,735
DERBY	5,000	STALYBRIDGE	750
DEWSBURY	845	STOCKTON-ON-TEES	937
DOVER	11,165	SWINDON	2,612
EAST HAM	34,000	WALTHAMSTOW	10,924
ECCLES	1,100	WEST HAM	80,707
ERITH	20,000	YARMOUTH (GREAT)	2,800
EXETER	4,000	YORK	3,436

TRAMWAYS CONTRIBUTING TO RATES.

	£		£
BELFAST	8,960	SALFORD	10,000
BIRKENHEAD	6,600	SMETHWICK	1,500
BLACKPOOL	3,000	WALLASEY	18,000
NEWCASTLE-UPON-TYNE	14,000	WALSALL	1,275
NELSON	233		

At Warrington the omnibus undertaking had to be subsidised to the extent of £1,000; West Bromwich, £3,000; Haslingden, £310; Stockton-on-Tees, £500; Widnes, £1,076; while in one instance, Walsall, a contribution was made to the rates, the amount being £624. In the previous year Warrington subsidised the omnibus undertaking to the amount of £2,000, while at Widnes the contribution to the undertaking was £1,389. Walsall omnibuses made a contribution to the rates of £624.

Institution of Electrical Engineers.—There will be a joint meeting of the Institution of Heating and Ventilating Engineers and the Institution of Electrical Engineers in the lecture theatre of the Institution at Savoy Place, Victoria Embankment, W.C., on Thursday, January 19, at 6 p.m., when a discussion will take place on the "Utilisation of waste heat from electrical generating stations" with introductory papers by Mr. C. I. Haden and Mr. F. H. Whysall.

Lambeth Approve of L.C.C. Railless Scheme.—The General Purposes Committee of Lambeth Borough Council, reporting on the proposed L.C.C. railless trolley omnibus route from West Norwood to Lee Green, stated that it followed very closely that to which the Borough Council had always adhered. The Committee were of opinion that the Council should offer no objection to that part of the route lying within the borough, subject to a slight modification that it should be along Chapel Road, instead of through Ernest and Rothschild Streets.

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MISCELLANEOUS NEWS AND NOTES.

Omnibuses for Blackpool.—Blackpool Tramways Committee propose to invite tenders for four single-deck motor omnibuses.

Luggage on Halifax Tramways.—The Tramways Committee have decided to charge for all passenger luggage on the cars when the weight exceeds 28 lbs.

Railless Suggested for Bristol.—Bristol Corporation suggests seeking powers to enable it, if so desired, to construct and work railless trolley lines on roads in Avonmouth.

Railless System for Melbourne.—A Bill has been passed by the Legislative Assembly authorising the construction of electric railway lines in the outer suburbs of Melbourne.

Price of Steel Bars Reduced.—The South Wales Siemens Steel Association have decided again to reduce the price of steel bars by 7s. 6d. a ton, making the price £7 7s. 6d. a ton. During the war steel bars fetched £30.

Southampton Omnibuses to be Sold.—Southampton Corporation, as will be seen from an advertisement in another column, are offering for sale six motor omnibuses of the double deck type, with a seating capacity for 42 passengers.

New Cars for Burnley.—Of five new cars ordered by Burnley Corporation Tramways for the Manchester Road system three have been delivered and the remainder are expected shortly. The cost of each car is stated to be about £4,000.

New Omnibus Service at Nottingham.—Nottingham Tramways Committee have authorised a new omnibus service between Upper Parliament Street and Bulwell market place and an improved tramcar service between the City market place and Carlton.

Omnibus Licence Refused at Sheffield.—Sheffield Watch Committee have refused an application for a licence to run motor omnibuses between Millhouses tramway terminus and the city boundary in connection with the proposed service to Dore.

Doncaster Seeks Omnibus Powers.—Doncaster Corporation are seeking powers in a Bill in the next Session of Parliament to run omnibuses within the borough and on certain roads in adjoining rural districts. The total length scheduled for these routes is 21 miles.

The Coatbridge and Airdrie Tramways, which were recently purchased by Glasgow Corporation for £82,250, were taken over by the latter last week. It is proposed to link up the Coatbridge track with the Glasgow tramways by extending the line which at present ends at Baillieston.

Proposed Hull Extension.—A special meeting of the Hull Corporation has been called for February 2 to discuss the question of making application to the Ministry of Transport for an order under the Light Railways Act, 1896, authorising the Corporation to construct a tramway about 1½ miles long at Hessle Road.

Blackburn Ratepayers and Parliamentary Bill.—Though Blackburn Corporation decided to promote a Parliamentary Bill empowering them to establish omnibus services within and beyond the town and to extend the tramways, a statutory ratepayers' meeting disapproved of the proposal. A plebiscite will probably be taken.

Penny Fares Foreshadowed at Birmingham.—Birmingham City Council have instructed the Tramways Committee to arrange at the earliest possible date for a reversion to penny fares. The Chairman of the Committee (Councillor F. Smith) warned the Council that lower fares at present would jeopardise the financial stability of the undertaking.

Bradford Corporation are laying about three and a half miles of double tramway track on sleepers. It is estimated that the cost of the work will be only about 50 per cent. of that of tramway track laid in the usual way, while the maintenance expenses will also be considerably lower owing to the greater resiliency of the rail supports.

Berlin Electric Omnibuses.—The "Electrotechnische Zeitschrift" announces that arrangements have been made for the establishment of three routes of electric accumulator omnibuses in Berlin. The service will be commenced with 80 vehicles, each providing 20 seats and 18 standing places. Re-charging will be effected at the company's own stations.

New London Tramway Route.—On January 22 a new route of the London County Council tramways will be opened between Chelsea and Southwark Bridge, via Clapham, Stockwell, Brixton and Camberwell Green. The total length of the route is nine miles, and there will be a three minutes' service during the rush hours and a four minutes' service at other times.

Traffic on Thames Embankment.—A poster just issued by the London County Council tramways department states that during the business rush the number of tramcars passing along the Embankment in each direction between Westminster and Waterloo Bridges in one hour is 195, or including trailer cars, 222. It is announced that this record will be further improved as traffic requires.

St. Helens Tramways Efficiency Meetings.—Some time ago Mr. L. C. F. Bellamy, general manager of the St. Helens Corporation tramways, inaugurated a series of efficiency meetings, which are proving very successful. The meetings are held fortnightly in the men's billiard room, and generally conclude with a short smoking concert. The following papers have been read:—"Urban Electric Traction: some phases of underground, surface and elevated systems," by L. C. F. Bellamy, general manager. "In the Grip of the Law: a review of tramway legislation," T. Kavanagh, traffic superintendent. Other papers have been read by Mr. F. L. Cokayne, chief inspector, Drivers Fred Jones (vice-president of the social and athletic club), Jackson and Taylor, and conductor Rowland. Lively discussions followed each paper.

Belfast Tramways and Proposed Fare Reduction.—The chairman of Belfast Tramways Committee (Councillor W. G. Turner), replying to a deputation from the Belfast Anti-Profiteering Committee, who pressed the Committee for a reduction of fares, pointed out that the tramways lost £39,000 last year, and therefore they could hold out no immediate prospect of a reduction. They would, however, undertake to reduce fares at the earliest possible moment.

Dublin Employees and Wage Reduction.—Dublin United Tramway Company's employees recently decided by 1,073 votes to 22 to strike against the proposed reduction of 5s. a week and the refusal of the inspectors to become members of the Tramway and Vehicle Workers' Union. Action was deferred, however, pending the result of a conference which was opened on Monday, under the auspices of the Labour Ministry, Dail Eireann, between representatives of the Company and the men's union.

The National Wages Board for the Railways of Great Britain commenced a sitting on Wednesday at the Industrial Court, Westminster, to consider the claim of the Scottish railway companies for abolition of the increases granted by the Board in their award of June, 1920, the removal of the special payment for night duty; that junior employees should not be recognised as adults until 21 years of age; and that hours of work constituting the standard day of the respective grades should be modified and varied. Sittings were resumed on Thursday and Friday.

Proposed Revival of Taunton Tramways.—Taunton Town Council on Tuesday unanimously passed a resolution that the Council regret the failure (last May) of the negotiations for the continuance of the tramway service in the borough by the Council, or by private enterprise, and that the Special Tramways Committee be instructed to reopen negotiations with the Taunton Electric Traction Company, for the transfer of the undertaking to the Council, and in the event of the impossibility of such negotiations being re-opened, the committee consider the establishment of an adequate service of motor omnibuses.

Transport Ministry and Omnibus By-Laws.—Bournemouth Corporation have received a letter from the Ministry of Health referring to draft by-laws submitted by the Council and stating that the Minister of Transport had appointed a Departmental Committee on the taxation and regulation of road vehicles, including in its purview the general question of control of omnibus traffic. The Minister, therefore, doubted how far it was expedient for the authority for a district comprising parts only of omnibus routes to attempt to deal with the question for the present, and he thought the Council would be well advised to defer the matter.

Tramway Managers and Reduced Fares.—In a report on the question of reduced fares, the engineer and manager of Pontypridd Urban District Tramways (Mr. J. E. Teasdel), states that he had obtained from the manager of Newport (Mon.) Corporation Tramways, replies from some 57 towns on the question of reduced fares. Generally speaking managers were of opinion that low fares for short distances is a wrong principle for small towns and that a 1d. fare to-day would have almost the same effect as that of the ½d. some years ago. Several managers pointed out that wages and costs had not decreased sufficiently to warrant 1d. fares. Mr. Teasdel recommends the adoption of tokens for the benefit of regular travellers.

The Nottinghamshire and Derbyshire Tramways.—A Bill has been deposited in Parliament by the Nottinghamshire and Derbyshire Tramways Company (as mentioned in our issue of December 15) applying for powers to construct a double line of tramways and tramroads to connect its existing system, terminating at Heanor, with the Ilkeston Corporation tramways. The latter were some time ago transferred by the Corporation to the company. In order to provide a through service the gauge of the Ilkeston tramways will be altered from 3 ft. 6 in. to 4 ft. 8½ in. The capital required is to be provided by empowering the company to raise the balance of its unissued capital of £96,470 as preference capital and to borrow upon its issued capital a sum of £126,765.

Centre Poles for Princes Street, Edinburgh.—At a meeting of Edinburgh Town Council on January 5, Mr. Malcolm Stuart moved that the resolution to have span wires in Princes Street, passed by the Council on December 29, be rescinded. He contended that the Council had consented to this form of overhead equipment on a snatch vote. The citizens generally could not help following in this case the advice of the tramway manager that centre poles would be much less objectionable. Mr. Douglas Elliott seconded and the motion of disapproval was carried by 37 votes to 22. Notice of motion was given to approach the Ministry of Transport for permission to erect centre poles. The Council have decided that wooden seats, and not cushions, be provided in the new cars.

Glasgow Re-considers Paisley Tramways Purchase.—Glasgow Town Council on January 5 again discussed the proposed purchase of the undertaking of the Paisley District Tramways Company. Mr. Miller opposed the acquisition of the system, which he alleged was in a most unsatisfactory state. Instead of Glasgow paying £200,000 or £250,000 it would probably be found that it would take £750,000 to put the system into that condition which would coincide with the city tramways. Mr. T. A. Kerr seconded. Treasurer Kelly moved that the matter should be further discussed by the Tramways Committee. He defended the proposal, and said the running of tramways beyond the municipal area had been profitable to Glasgow. The question of acquiring this system was just a question of price. He admitted the Paisley company had not been a success, and personally he would like to get from Mr. Dalrymple some more definite information as to how the system was to be made to pay. Bailie M'Whirr (convener of the Tramways Committee)

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supported Treasurer Kelly's amendment, and Bailie Dollan strongly urged the acquisition of the system. It was decided to remit the question to the Tramways Committee.

The Bristol Tramways and Carriage Company, who operate tramway and omnibus services on over 600 miles of road in Somerset, Gloucester and Wilts, now issue their official time table monthly. Their services, which are frequently being extended, make it possible to travel by road to Bridgwater, Street and Frome in the south, Tewkesbury or Broadway, via Gloucester, in the north, and via Swindon to Faringdon or Hungerford in the east.

Suggested Co-ordination of Merseyside Services.—Liverpool City Council on Jan. 4 appointed a special committee to consider the question of greater co-operation between the Merseyside municipalities, including Liverpool, Bootle, Birkenhead, and Wallasey, and also the improvement of cross-river communications. Sir Archibald Salvidge, who initiated the proposal, said it would inure to the advantage of the communities as a whole if several of the public utility services which were more or less common to the whole were co-ordinated, including such matters as public health, hospitals, roads, road traffic, drainage, tramways, water supply, electricity supply, police, housing, fire brigades, and education. He also claimed that any new undertaking for the betterment of cross-river transport, whether a tunnel or a bridge, or otherwise, should receive some Government financial support.

International Tramways Union.—The Executive Committee of the Union Internationale de Tramways et de Chemins de Fer d'Intérêt Local have issued a notification that the Association having been legally dissolved, they now intend to proceed with the constitution of the new Association, limited by previous decision to members of the Entente and neutral countries. The committee have decided to summon, as soon as possible, a general assembly of members of the former Union, with the restriction indicated, and of those who wish to participate in the reorganisation. It will be proposed also that a congress should take place in 1922. The committee rely upon the sympathetic co-operation of all those who appreciate the importance of the work which the Union has carried on during the 37 years of its existence, and which has contributed in no small degree to the progress of the industry of public transport. The Executive Committee is constituted as follows:—Honorary president, Baron Janssen; president, C. de Burlet; vice-president, H. Geron; members, J. Kessels, A. Mariage, G. Pavie, Ch. Rochat and Ch. Thonet; general secretary, H. Camp. The offices of the Union are at 23, Rue d'Arlon, Brussels.

PERSONAL.

Sheffield Corporation Tramways and Motors Committee have recommended an increase in the salary of **Mr. H. Watson,** assistant manager, from £500 to £550 per annum.

FINANCIAL.

The Fife Tramway Light and Power Co. have arranged for the issue of 250,000 7 per cent. debentures at 93.

London and Suburban Traction Group.—The receipts for the week ended January 7 were £45,872 (previous week £45,548).

London Underground Group Receipts.—The receipts of the Common Fund Companies for the week ended January 7 amounted to £213,332 (previous week £192,964).

Mexican Electric Tramways Company.—Holders of the 5 per cent. first charge debentures will meet on February 8 to consider a resolution sanctioning certain proposed modifications of the rights of debenture holders.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended January 11 amounted to £87,768, a decrease of £18,181 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year) to January 11 (41 weeks) the total receipts were £4,050,060, an increase of £271,395 on the corresponding period of 1921.

Blackpool Corporation Tramways.—The report of the general manager, Mr. Charles Furness, for the year ended March 31, 1921, shows that the traffic receipts amounted to £276,586, and other receipts to £7,885, making a total income of £284,471. Working expenses aggregated £240,148, leaving a gross profit of £44,323. Deducting interest and sinking fund charges, amounting to £44,179, there is a surplus of £143. Mr. Furness considers the results disappointing as they fall far short of the estimates prepared at the commencement of the financial year. An analysis of the accounts shows that the increased operating expenses have not been met by prevailing fares. The Ministry of Transport sanctioned a temporary increase of fares until February, 1923, but Mr. Furness thinks an earlier revision in fares and stages would have been justified. During the first full year of operation since the Blackpool and Fleetwood Tramroad was acquired, this route was not self-supporting. Mr. Furness observes that the purchase would be looked upon by some as a poor speculation, but he draws attention to the difference between the financial methods in company and municipal working. A sum of no less than £21,000 in connection with the Fleetwood tramroad was required for interest on loans and contribution to the sinking fund, while a sum of only £10,000 provided a reasonable dividend for the shareholders. The tramways permanent way renewal fund now has a net balance of £72,024, but accumulated arrears of work since 1914 will entail heavy charges against the revenues of the department, as the borough engineer estimates that it will be necessary to spend £254,343 during the next three years. The cost per car mile for maintenance in the last year was 2.14d. Power consumption shows a reduction from 1.75 units to 1.55 units per car mile. Much repair and renewal work on cars was carried out during the year, and the sum so spent increased from £18,985 in 1920 to £32,251 in 1921. As regards wages, it is pointed out that the agreement of March, 1919, has had the effect of increasing the wages of motormen and conductors from 4.48d. to 6.39d. per car mile, or equivalent to 42.6 per cent. The wages paid to all grades in the tramways department, excluding permanent way, amounted to £118,828, equivalent to 49 per cent. of the total expenditure. In conclusion, Mr. Furness points out that it would be impossible to allocate any sum out of profits to the reserve fund, and the revenue accounts for the present year will be called upon to meet expenditure which was formerly charged to the tramways reserve account. Another burden is the increase in capital expenditure, requiring further contributions in interest and redemption charges. Having regard to these adverse circumstances, he warns the Corporation that if it is intended to restore the tramway finances to their former level every care will have to be taken in dealing with the complex questions which directly affect the revenues of the department.

CONTRACTS.

The British Thomson-Houston Company have received an order for 114 motors and 100 controllers from the Manchester Corporation tramways.

Halifax Tramways Committee have accepted the tender of Messrs. Vickers, Ltd., Sheffield, for the supply of 72 motor pinion wheels at £1 8s. each.

Blackpool Corporation Tramways Committee have accepted the tender of the British Insulated and Helsby Cables, Ltd., for high tension cable, and that of the Pirelli General Cable Works for low tension cable.

Salford Tramways Committee have accepted the following tenders for car accessories for three months to March 31, 1922:—Cable and lamps, Power and Lighting Supplies Co., Ltd.; cable connectors, etc., L. Andrew & Co.; armature and field coils, Barrett and Thornton; insulating varnish, Griffiths Bros. & Co. (London), Ltd.; lamps, British Insulated and Helsby Cables, Ltd.; carbon brushes, J. Eades; field coils and commutator segments, Metropolitan-Vickers Electrical Co., Ltd.; brake blocks, National Railway and Tramway Appliances Co., Ltd.; trolley head slippers, British Insulated and Helsby Cables, Ltd.; trolley heads, G. W. Alsop; gears and pinions, British Hele-Shaw Patent Clutch Co., Ltd.

B. T-H. Controllers for Edinburgh Cars.—When reporting the contracts recently arranged by Edinburgh Corporation for new trucks and equipments in our issue of last week an error occurred in the statement with reference to the controllers. The order for 106 controllers required for the 53 cars has been placed with the British Thomson-Houston Company, Ltd., of Rugby. The motors and track brakes, as previously mentioned, will be supplied by the Metropolitan-Vickers Company, Ltd. The order for trucks has been placed with the Peckham Truck and Engineering Company, Ltd., while that for the sets of grid resistances was secured by the Electro-Mechanical Brake Company, Ltd., of West Bromwich. The amounts of the contracts are as follows:—53 tramway trucks, £9,010; 106 interpole light-weight traction motors, £18,020; 106 controllers, £5,814; 53 car sets of grid resistances, £742.

The Rail and Road Car Equipment Company has recently been formed by Messrs. A. V. Dismore and A. J. Smith (with offices at 205-207, City Road, London, E.C.1) both of whom have severed their connection with the late General Seating Company, Ltd., for the purpose of continuing the manufacture and supply of various materials similar to those hitherto handled by that company. Among the patented articles which will be supplied by the new company are the "Flex-edge" and spring cushions, "Revenu" deck chairs, "N.C." friction fittings, destination and other indicators, lettered screens and various other car fittings and accessories.

METAL PRICES.*

		Price on January 12.	Price on January 5.
COPPER.			
Best Selected	per ton	£68 10s.	£68 10s.
Electro Wirebars	per ton	£74	£74 10s.
H.C. Wire, basis	per lb.	11½d.	11¾d.
Sheet	per lb.	10½d.	10½d.
PHOSPHOR BRONZE WIRE (Telephone).			
Phosphor Bronze Wire, basis ...	per lb.	1s. 3¾d.	1s. 3¾d.
BRASS 60/40.			
Rod, basis	per lb.	7½d.	7½d.
Sheet "	per lb.	10¾d.	10¾d.
Wire "	per lb.	10½d.	11½d.
PIG IRON.			
Cleveland Warrants	per ton	£4 15s.	£5 5s
Galvanised Steel Wire, basis 8 S W G	per ton	£22	£22
LEAD PIG.			
English	per ton	£26	£26
Foreign or Colonial	per ton	£24 7s. 6d.	£24 5s.
TIN.			
Ingot	per ton	£165 15s.	£167 15s.
Wire, basis	per lb.	2s. 2¾d.	2s. 3½d.

* Supplied by the British Insulated and Helsby Cables, Ltd.

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TENDERS INVITED.

COUNTY BOROUGH OF HUDDERSFIELD.

Tramways Department.

Tenders are invited for the supply and delivery of the following :—
190 Motormen's Uniforms (D.B. Tunics and Trousers).
160 Conductors' Uniforms (S.B. Tunics and Trousers).
16 Inspectors' Uniforms (Tunics and Trousers).
370 Uniform Straw Caps with White Covers.

Alternative Tenders are also invited for the cutting, making and trimming only (supply of cloth excluded) of Uniforms as enumerated.

Sample garments, caps, cloths, linings, trimmings, etc., to be submitted with Tender.

Sample uniforms may be inspected at the Tramways General Office, where Tender Forms may be obtained on application.

Die for brass buttons supplied by Corporation.

Sealed Tenders, endorsed "Uniforms," together with samples, to be delivered to the undersigned not later than January 31, 1922.

A. A. BLACKBURN,
General Manager and Engineer.

Tramways General Office,
John William Street,
Huddersfield.

COUNTY BOROUGH OF BURNLEY.

Tramways Department.

Uniform and General Stores.

The Corporation invite Tenders for the supply of Uniform for three years ending March 31, 1925, and General Stores for one year ending March 31, 1923.

Full particulars and schedules on application to the General Manager, Queensgate Depot, Burnley.

Tenders, addressed to the "Chairman of the Tramways Committee, Town Hall, Burnley," and endorsed "Uniform" or "General Stores," must be delivered at my office not later than Thursday, January 26, 1922.

J. D. RITCHIE,
Town Clerk.

Town Hall, Burnley.
January 6, 1922.

CITY OF YORK TRAMWAYS DEPARTMENT.

Uniforms.

The Tramways Committee invite tenders for the supply of Uniform Clothing for Inspectors, Motormen and Conductors. Sample Garments may be seen and Tender Forms obtained on application at the Tramway Offices, Clifford Street, York. Sealed tenders and samples of cloth endorsed "Uniform Clothing" addressed to the Acting Tramways Manager must be delivered not later than Monday, January 30, 1922. No pledge is given to accept the lowest or any tender.

FOR SALE.

SHEFFIELD CORPORATION TRAMWAYS AND MOTORS.

Five G.E.52 Traction Motors for disposal; good condition. Full particulars from the GENERAL MANAGER, Sheffield Corporation Tramways and Motors, Division Street, Sheffield.

January 6, 1922.

COUNTY BOROUGH OF SOUTHAMPTON.

Sale of Motor Omnibuses.

The Corporation have for Sale, and invite offers for the purchase of Six Motor Omnibuses.

The chassis are 35/40 h.-p. Thornycroft "J" type, and the bodies are of the double deck type, with seating capacity for 20 inside and 22 outside.

Further particulars can be obtained, or inspection may be arranged, on application to the General Manager and Engineer, 161, Above Bar Street, Southampton.

Sealed Tenders, endorsed "Tender for Motor Omnibuses," must be delivered at the Town Clerk's Office, Municipal Offices, Southampton, on or before the 21st instant.

No pledge is given to accept any offer.

R. R. LINTHORNE,
Town Clerk.

January 6, 1922.

POSITION VACANT.

INSPECTORS.

Inspectors. Two required; must have had experience in ticket check, compiling duty sheets and general office routine. Smart appearance and good disciplinarian essential. Wages £3 15s.

Apply, TRAMWAYS, Box 22, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	Jan. 4	4,033	3,720	— 313	31½	114.281	— 9,772
" Motor Buses	" 4	..	197	..	31½	8,247	+ 7,492
Ayr Corporation ..	" 7	632	554	— 78	34	26,332	— 1,519
Barrow Corporation ..	" 7	879	641	— 238	40	34,395	— 1,992
Belfast City	" 6	11,064	12,080	+ 1,016	40	506,034	+ 46,753
Birkenhead Corporation	" 8	2,807	2,625	— 182	39½	105,889	— 12,152
" Motor Buses	" 8	390	553	+ 163	39½	27,836	+ 10,928
Birmingham Corporat'n	Dec. 31	31,704	25,543	— 6,161	39	1,150,820	— 86,089
" Motor Buses	" 31	1,750	1,465	— 285	39	79,156	— 226
Blackburn Corporation	Jan. 4	2,431	2,393	— 38	40½	98,004	— 8,056
Bradford Corporation..	Dec. 31	15,443	12,862	— 2,581	39	539,384	+ 18,697
Burnley Corporation ..	Jan. 7	3,432	3,234	— 198	..	..	..
Burton-on-Trent Corp.	" 8	658	583	— 75	40	25,383	+ 834
Bury Corporation ..	" 8	2,489	2,285	— 204	40½	99,641	— 3,482
Chatham & District ..	Dec. 31	1,857	1,958	+ 101	52	86,658	— 3,422
Chesterfield Corporat'n.	Jan. 2	696	598	— 98	40	23,578	— 62
" Motor Buses	" 2	1,017	856	— 161	40	31,118	— 674
Derby Corporation ..	" 7	2,367	2,069	— 298	40	87,284	— 5,196
Dundee City ..	" 4	3,518	3,290	— 228	33½	109,201	+ 7,154
East Ham Corporation	" 7	2,336	2,032	— 304	39½	85,460	+ 2,659
Edinburgh Corp. Trys.	Dec. 31	..	12,069	..	33	428,098	+ 12,525
" Motor Buses	" 31	..	3,333	..	33	120,116	..
Glasgow Corporation ..	Jan. 7	47,927	44,896	— 3,031	31½	1,444,882	+ 25,225
Glossop (U.E. Sup. Co.)	" 7	246	240	— 6	1	240	— 6
Halifax Corporation ..	" 3	4,618	3,992	— 626	38½	174,515	+ 4,551
" Motor Buses	" 3	125	66	— 59	38½	3,156	— 1,275
" Railless Cars	" 3	..	52	..	24	1,376	..
Huddersfield Corporatn.	" 7	5,173	* 4,836	— 337	41	214,792	+ 11,097
Ilford U.D. Council ..	" 7	1,425	1,420	— 5	40½	60,993	+ 8,115
Ipswich Corporation ...	" 8	897	776	— 121	40	35,331	— 4,437
Isle of Thanet ..	" 4	570	550	— 20	13	9,176	+ 1,208
Kilmarnock Corporat'n	" 7	460	410	— 50	33½	12.445	— 121
Leicester Corporation..	" 7	6,695	7,085	+ 390	1	7,085	+ 390
Liverpool Corporation	" 7	27,867	30,332	+ 2,465	1½	30,332	+ 2,465
London County Ccl. ..	" 11	105,949	87,768	— 18,181	41	4,050,060	+ 271,395
Maidstone Corporation	" 5	535	536	+ 1	39	19,432	— 306
Manchester Corp. ..	" 7	39,083	35,880	— 3,203	40	1,568,178	+ 197,545
Newcastle-on-T. Corp.	Dec. 24	11,107	11,834	+ 727	38	436,122	+ 14,691
Nottingham Corp. ..	Jan. 5	7,590	7,224	— 366	40	271,085	— 39,678
Oldham Corporation ...	" 8	4,642	4,332	— 310	42	199,107	+ 4,232
Preston Corporation ...	" 4	2,014	1,873	— 141	39½	76,796	+ 4,348
Reading Corporation ...	" 5	1,620	1,557	— 63	40	64,123	— 2,827
" Motor Buses	" 5	297	323	+ 26	40	13,859	+ 3,241
Rotherham Corporation	" 2	2.913	2,494	— 419	39	88,692	— 15,406
Sheffield Corporation..	" 8	20,947	18,584	— 2,363	40½	790,847	— 52,971
Southampton Corp. ..	" 4	3,251	2,855	— 396	40	118,938	— 7,662
" Motor Buses	" 4	333	100	— 233	40	6,423	— 3,482
Southend-on-Sea Corp.	" 4	1,631	1,865	+ 234	40	103,362	+ 6,472
South Shields Corp. ..	Dec. 31	1,985	1,659	— 326	40	67,325	— 9,015
St. Helens Corporation	Jan. 3	2,116	1,696	— 420	40	72,553	— 10,827
Sunderland Corp. ..	" 8	2,995	2,549	— 446	40	106,573	— 18,008
Swindon Corporation..	" 4	397	369	— 28	39½	16,015	+ 417
Tyneside Trys., Trds...	Dec. 28	1,105	980	— 125	26	28,228	— 5,073
Wallasey Corp. ..	Jan. 7	2,814	2,706	— 108	40½	114,224	+ 8,617
" Motor Buses	" 7	139	194	+ 55	40½	9,724	+ 2,685
Walsall Corporation ..	Dec. 31	2,344	1,656	— 688	40	65,038	— 5,453
" Motor Buses	" 31	1,728	1,035	— 693	40	37,110	— 8,041
Walthamstow U.D.C....	Jan. 7	1,969	1,614	— 355	40½	83,924	+ 910
Warrington Corp. ..	" 5	1,012	1,086	+ 74	40	39.900	+ 28
West Ham Corp. ..	" 5	6,548	5,598	— 950	40	238,012	+ 6,816
Wolverhampton Corp.	" 11	2,407	2,191	— 216	41	96,379	— 3,589
" Motor Buses	" 11	630	622	— 8	41	26,907	+ 8,783

* Includes Motor Omnibus receipts for 1921-22.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1920-21.	1921-22.	AGGREGATE. Wks.	1921-22.	In. or Dec.
Anglo-Argentine ..	Jan. 7	£85,871	81,642	1	£81,642	— £4,229
Ballarat & Ben. (4 wks.)	Nov. 6	4,810	5,137	32	35,525	+ 2,525
Brazilian Traction (Mlrs)	Nov.	12,199,000	14,555,000	48	155,462,000	+ 33,156,000
Brisbane	Oct.	46,310	47,880	44	471,920	+ 12,590
British Columbia $	Nov.	858,842	877,335	22	4,252,802	+ 153,099
Buenos Aires Lacroze ..	Dec.	62,857	63,381	26	343,619	+ 7,333
Burmah Tr. & Lght. Rs.	Dec.	50,481	54,194	22	291,385	+ 32,657
Calcutta .. Rs.	Jan. 7	97,982	97,904	1	97,904	— 78
Cape Town	Nov.	25,628	27,004	..	..	..
Carthagena & Herrerias	Dec.	5,560	3,237	52	31,052	— 19.305
Cordoba	Oct.	19,627	23,203	31	162,653	+ 22,646
East India	Nov.	4,234	3,945	16	16,696	— 174
Kalgoorlie ..	Sept.	3,361	2,829	39	20,119	— 7,490
La Plata ..	Nov.	5,573	6,453	48	58,098	— 3,652
Madras (2 weeks) Rs.	Nov. 30	42,446	43,605	44	915,870	— 172,416
Manila .. .. $	Nov.	320,345	306,850	48	3,364,545	+ 206,755
Montevideo	Nov.	43,846	47,426	4	47,426	+ 3,580
Para	Nov.	24,273	23,147	52	287,814	— 9,084
Pernambuco	Jan. 8	4,512	3,534	1½	4,108	— 1,797
Port Elizabeth	Nov.	6,620	6,828	..	..	..
Rangoon .. Rs.	Dec.	120,000	137,750	52	1,628,551	+ 228,798
Shanghai .. $	Nov.	161,314	184,850	48	1,855,888	+ 189,000
Singapore .. $	Oct. 22	16,401	14,533	43	556,906	— 333,040
Toronto .. .. $	July	1,189,815	1,229,483	30	8,877,669	+ 642,606
Winnipeg .. $	Nov.	477,957	477,880	48	4,910,971	+ 156,466

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, JANUARY 19, 1922. VOL. LI.

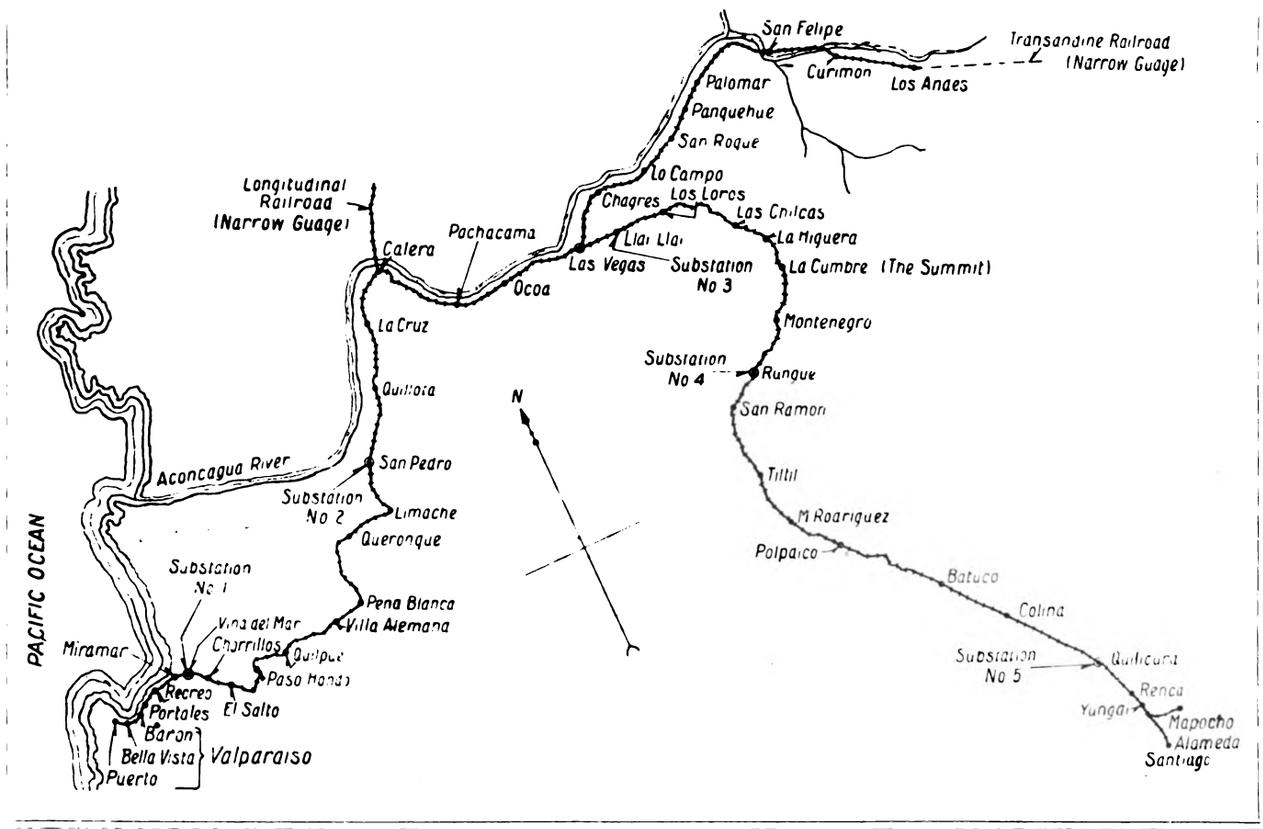
ELECTRIFICATION OF CHILIAN STATE RAILWAYS.

An initial contract provides for complete electrification of first zone, and includes 144 miles, 39 locomotives, and five sub-stations.

The Chilian Government has decided to electrify the steam railways. In spite of competition from European firms, the contract has recently been placed with the Westinghouse International Electric Company, through their South American representatives, Errazuriz Simpson and Company. This electrification is by far the most important railway electrification undertaken in 1921, and it is said to be the largest and most comprehensive single order for electric railway equipment ever received.

Chile, which has an area of 290,000 square miles, and a population of 4,000,000 is a long, narrow country located between the Andes mountains and the Pacific Ocean, on the West Coast of South America. It is 2,629 miles long north to south, or more than four times the distance from London to Inverness, and varies from 100 to 250 miles in width. The extreme length of the country results in a variety of climatic conditions. However, in the section to be electrified at present, the variation between maximum and minimum temperatures conforms to normal conditions existing in the temperate zones, the maximum temperature in the shade in the summer being from 100 to 110 deg. F., and in the sun as high as 130 to 140 deg. F., while in the winter the temperature goes as low as 20 to 25 deg. F. The rainfall in this district is relatively small. In the central and southern sections the Andes receive a heavy snowfall, making extensive water power available.

The chief products of Chile are minerals, agricultural



Outline Map Showing First Zone of Chilian State Railways to be Electrified.

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products, live stock, and lumber. Many of these products are exported and carried north over the railway. In return, coal, merchandise, machinery, and food products are imported, and form the bulk of the southward railroad movement. In Chile the nitrate deposits in the north rank first among the mineral deposits, and supply 75 per cent. of the exports. In 1913, 60,000,000 quintals were exported. Coal deposits rank second to those of nitrates, but in spite of this fact there is not enough coal to supply the country, and considerable coal is imported. The

Santiago Station of Chilian State Railways which will be Electrified.

present output of coal in Chile is 1,800,000 tons annually, while the consumption is about 2,700,000 tons, the railroads using 550,000 tons. Copper is also a very important mineral deposit, between 4 and 5 per cent. of the world's supply coming from Chile. Iron, sulphur, and gold are also mined. Other industries in Chile are farming and some fishing. The variety of climate permits the growth of a great diversity of food plants, among which are tropical fruits, vegetables, and cereals, including wheat, barley, oats, rye, corn, beans, and peas. In import trade to Chile the United States now ranks first and Great Britain second.

The railways of Chile aggregate 5,200 miles, of which about 30 per cent. (mainly for mining and industrial enterprises) is privately owned. The remainder of the mileage is divided into two general classes, the broad gauge lines and the narrow gauge lines. The former extend south from Valparaiso by way of Santiago to Paerto Montt, with numerous branches, while the latter comprise most of the northern roads, with a few branch lines in the south.

The conditions that arose during the recent world war brought very forcefully to the attention of the railroad management the necessity for electrifying the broad gauge lines, especially the Valparaiso-Santiago line with the Los Andes branch, where traffic was rapidly approaching the track capacity. In addition, fuel costs were excessive, while the almost limitless water power was going to waste.

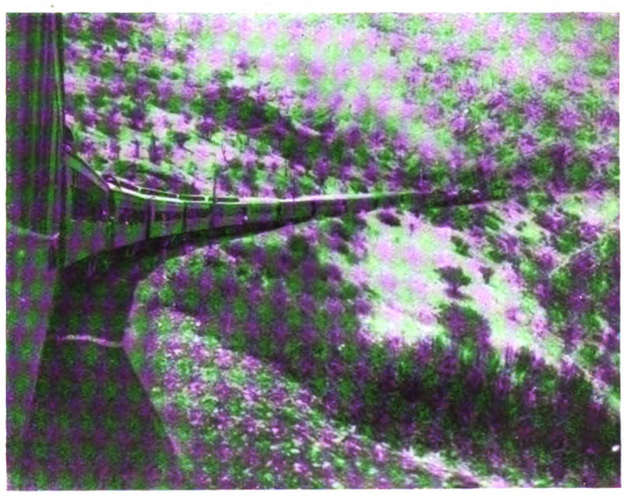
In 1918 a Commission was appointed to study the problem of electrifying the broad gauge lines. This Commission, consisting of Rafel S. Edwards and Ricardo P. Solar, made a careful analysis of electrification all over the world. As a result of the possible economies shown in the report of this Commission, it was decided to electrify immediately the broad gauge lines, beginning with the Valparaiso-Santiago and Los Andes branches, or the first zone. A loan of 10,500,000 dollars for this purpose was authorised, and was heavily over-subscribed.

The awarding of the contract to the Westinghouse Company is a tribute to the exhaustive study made by its engineers in conjunction with those of the local firm, Errazuriz Simpson and Company. Every possible condition which could affect, or be affected by, the proposed electrification was considered, for the specifications called not only for locomotives to fit the traffic conditions but also for all sub-station, distribution, and overhead equipment, and for all construction work; in other words, for the complete electrification of the railroad.

Initial Electrification Scheme.

The initial electrification will include 116 miles from Valparaiso to Santiago, and 28 miles from Las Vegas to Los Andes, a total of 144 miles, as shown on the accompanying map. Los Andes is the terminus of the Transandine Railroad, a narrow gauge line, while the narrow gauge longitudinal railroad runs north from Calera, an important station on the line to be electrified. The maximum grade in this zone is 2·25 per cent., encountered in approaching La Cumbre (the Summit) from the west. The line contains a relatively large number of curves, the maximum being 10 deg. The track gauge is 5 ft. 6 in. There are six tunnels on the main line, the longest, the San Pedro, being 1,600 ft. in length. Three of the tunnels are located on the most severe grade approaching the Summit.

The 3,000-volt direct-current system was adopted as best suited to the conditions. Hydro-electric power will be generated at the Maitines Station of the Chilian Electric Tramway and Light Company, Limited. This station is already under construction, and will utilise the waters of the Rio Colorado. The station will contain three 8,125-KVA. Westinghouse generators, and will have an ultimate capacity of 30,000 KW. This power will be transmitted 37 miles to Santiago by twin circuit 110,000-volt transmission lines, and



A Thirteen-Coach Train on Chilian State Railways, Drawn by Two Steam Locomotives.

will be generated at 50 cycles, 3-phase. These transmission lines will be connected at Santiago with the system fed by the Florida hydro-electric station and the Mapocho steam station, both of which were constructed some years ago by the Germans, and were designed for 50 cycle 3-phase power. The total capacity of the three generating systems at present proposed will be, when completed, approximately 120,000 KW.

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The power supply will be distributed by five sub-stations designed to handle a train movement that is approximately 50 per cent. greater than that existing in 1917, with a further provision for tripling the 1917 traffic demands if necessary. Each station will initially contain two Westinghouse 2,000-KW. motor generator sets, each set consisting of a 2,800-H.P. driving motor, and two 1,000-KW. 1,500-volt generators connected in series. These sets will be designed to withstand a 200 per cent. overload for five minutes without injury, and as an additional safeguard the flash suppressor which the Westinghouse Company has developed will be included.

Sub-stations Nos. 1 and 5 will receive power at 12,000 volts, while Nos. 2, 3 and 4 will receive power at 44,000 volts. Transformers and switching equipment will be of the Westinghouse latest design, and the Westinghouse developed power indicating and limiting equipment will be installed.

Thirty-nine electric locomotives are required for the initial electrification, including 6 express passenger, 11 local passenger, 15 road freight, and 7 switching locomotives. The main points of interest about these locomotives are given in the following table—

Type Loco.	Weight. Tons.	Length. Ft.	Length. Ins.	Wheel Arrangement.	No. of Motors.	Total H P.	Max. Speed. Miles per hour.
Express passenger	127	58	6	2-6-0—0-6-2	6	2,250	62½
Local passenger ...	80	40	6	0-4-0—0-4-0	4	1,500	56
Road freight ...	113	49	10	0-6-0—0-6-0	6	1,680	40
Switching	65	40	0	0-4-0—0-4-0	4	480	34

All locomotives will be equipped with Westinghouse motors, and the express passenger and road freight locomotives will be equipped with the Westinghouse system of regenerative braking, with its latest developments. The service which the local passenger locomotives will perform will not require or justify the regenerative braking feature.

The fact that this contract includes only the first railroad zone indicates the magnitude of the project of electrification which Chile has undertaken.

PAULISTA RAILWAYS BEGIN ELECTRIC OPERATION.

The freight locomotives recently shipped from Pittsburgh, Penn., by the Westinghouse Electric and Manufacturing Company to the Paulista Railways of Brazil are now in service between Jundiahy and Louveira. These electric locomotives are the first to be used in Brazil, and the inauguration of electric service there represents an important step in the electrification of South American railroads. The new locomotives haul trains of from 43 to 45 units over grades as steep as 1·5 per cent. The so-called "unit car" is of 10 tons gross weight, and the term refers to the old wooden car of thirty years ago. Modern cars are said to be two, three, or four units, according to their size and load. Thus a train of 45 units represents 450 tons weight and is approximately 675 feet in length. Under former steam operation such trains could not be carried over a 1·5 per cent. grade at a speed greater than 9·25 miles per hour. The Westinghouse locomotives make such grades at 28 miles per hour, which means trebling the capacity of the track and greatly increasing the speed of handling freight shipments.

TROLLEY OMNIBUS IN CANADA.

First Railless Car for the Dominion Purchased by Toronto.

The Toronto Transportation Commission has recently placed an order with the Packard Ontario Motor Car Company for four complete trolley omnibuses for service in the city of Toronto. Bodies for these vehicles will be built by the Canadian Brill Company, and all electrical equipment will be supplied by the Canadian Westinghouse Company. The omnibuses will be completely assembled in Canada by the Packard Company. This is the first installation of the kind ordered for Canada.

The cars will be similar in construction to the demonstration vehicle completed by the Packard Motor Car Company on August 22, 1921, and will be used to furnish transportation service in the outlying districts of Toronto.

The electrical equipment will be practically the same as that used on the Packard demonstration omnibus

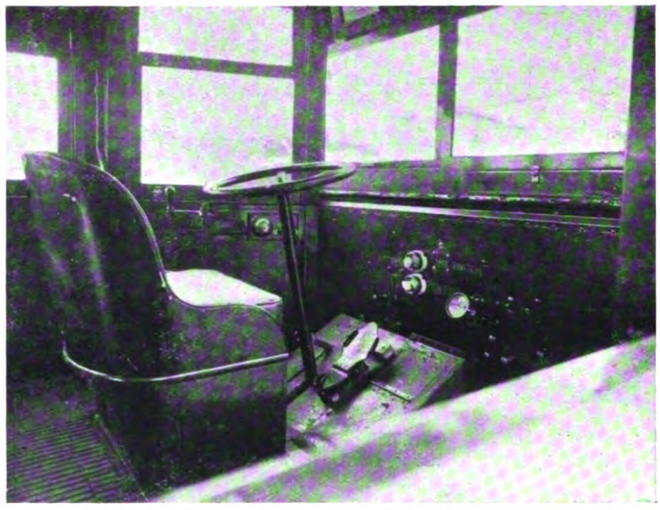

Fig. 1.—Operator's Position in Toronto Trolley Omnibus.

mentioned above and on the machine recently completed by the St. Louis Car Company, and now in Detroit for demonstration purposes.

The design of the electrical equipment is such that no unsightly or bulky portions of the apparatus are placed inside the body of the vehicle, the only portions of the apparatus inside of the body being two snap switches, the reverser handle, the overload trip and reset buttons, and the foot pedal. The control is of the all-foot type, making use of a well-designed foot pedal pivoted at the instep so that the operator's foot rests comfortably upon the pedal at all times. The foot pedal, through a suitable linkwork, revolves the drum of the master controller, which is interlocked with the offset knife-blade type reversing switch. Three points are definitely indicated in the operation of the foot pedal; the first is a slow speed switching point for use when the vehicle is following very slow moving traffic, the second gives series running, while the third or last position is the parallel or full speed notch.

Time Element Control Without Disadvantages.

The master controller, in conjunction with a sequence relay, controls the functioning of a motor-driven sequence switch. The drum development of the latter provides for the closing of the various contactors in

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the proper sequence to accelerate the omnibus to the full series position, accomplish transition, and complete the acceleration to the full parallel position. Within certain limits the speed at which the sequence switch drum revolves is inversely proportional to the current flowing through the main motors; however, it is impossible to completely stall the sequence switch motor, so that this scheme of operation also affords the benefits derived from a time element control without the disadvantages ordinarily encountered. Thus it will be seen that when the omnibus is heavily loaded or ascending a grade the acceleration is slower than when the omnibus is running light on a level street. At the same time the acceleration is positive under all conditions of load and grade. There is no necessity for auxiliary bypass buttons or notching levers, often required when automatic control is applied to city service.

A double-pole line switch in connection with a suitable overload trip offers protection to the equipment from severe overloads. A four-blade double-throw cut-out switch provides for cutting out either of the motors in case of a motor failure. The reversing switch is so constructed that the handle may only be removed when the blades are in the neutral position. When in this position an interlock prevents the master controller from being operated. When the reversing switch is in the forward or reverse position, the same interlock provides protection against any attempt to change its position with the controller "on."

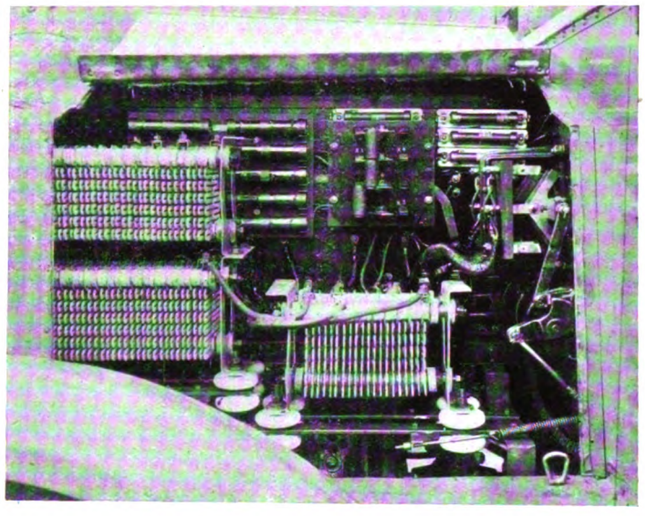

Fig. 2.—Mounting of Electrical Apparatus in Grid Resister Side of Hood Compartment.

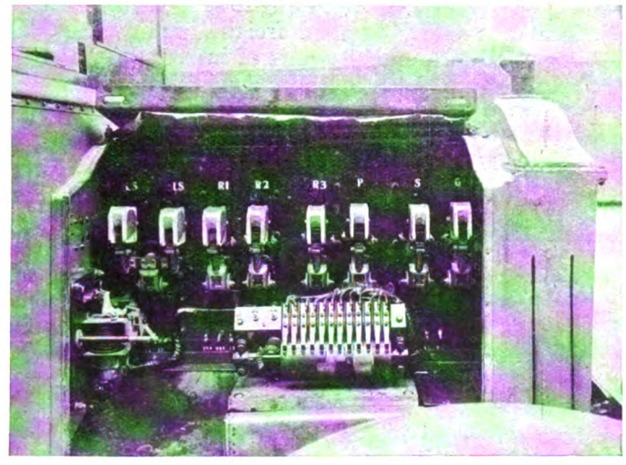

Fig. 3.—The Contactor Equipment is Mounted in the Right Hood Compartment.

The accompanying illustrations show the method of mounting the apparatus in the right and left hand sides of the hood compartment, which is divided by a panel of micarta backed on the resister side with fireproof material. The compartment containing the grid resister is cooled by air passing in through the louvres at the front and downward and outward beneath the omnibus. The contactor side of the hood compartment is also ventilated, while suitable provision is made for guarding against water and dust.

The scheme of control is very similar to that which has been in successful service for the past two years on the Third Avenue Street Railway in New York City. These 50 cars were purchased in July, 1919, and their performance has demonstrated that this scheme of control is well adapted for vehicles operating in city service through traffic of varying density.

New Development of Current Collector.

The current collector, or trolley, which will be furnished to the Toronto Transportation Commission, consists of a special single R.D. Nuttall base with a single pole approximately 14 feet long, at the head of which is a specially designed casting provided for the mounting of two separate arms of insulating material, each 24 inches long. These arms are connected to the pole head casting through a spiral spring approximately 2 inches in diameter and 6 inches long, permitting the arms to swing freely in any direction. Immediately beneath the spring are hinged steel rods so connected to the pole head casting and the casting supporting the tube which forms the arm that the spring is in tension when the trolley is on the wire. This feature permits of only a slight deflection in the downward direction of the arm, but at the same time permits it to swing freely sidewise or to follow the vertical deviation of the trolley wire. At the end of the two insulating tubes are mounted ball bearing swivel harps of cast aluminium, so designed that it is very difficult, if not impossible, for the trolley wire or cross suspension wire to become entangled in them.

The omnibus will be propelled by two Westinghouse type 508A sleeve bearing railway motors of standard design, with the exception of the shaft, which will have a tapered extension at either end so that the two motors will be interchangeable, and either may be used in the front or rear position of the omnibus. The motors will be connected in tandem, and mechanically secured to the drive with flexible couplings.

FRENCH ENGINEERING COURSE FOR BRITISH STUDENTS.

The Société des Ingénieurs Civils de France informs us that the French engineering firms of Lorraine district (rolling stock, railway materials, etc.) have kindly consented to accept for a period of two or three months a few British engineering students during their summer holidays. Application in writing, stating age, qualifications, and giving references, will be received (until further notice) by the Hon. Secretary, British Section of Société des Ingénieurs Civils de France, 45 Great Marlborough Street, London, W.1. The students will not receive any salary, and will make their own arrangements for the journey, board and lodging. Local members of the Société will give advice in these matters if desired. The students, in their own interest, will undertake to submit to the same discipline and working hours as their French colleagues on the works staff. Some knowledge of the French language is desirable.

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SANDBERG SORBITIC STEEL FOR TYRES.

The question of obtaining harder tyres has been the subject of a good deal of thought and consideration on the part of tramway engineers for a long time past, but it was not until 1921 that the British Engineering Standards Association drew up and published a standard specification for tramway tyres. This standard specification calls for a tensile strength of from 60-70 tons per square inch and for a certain deflection under the falling weight test.

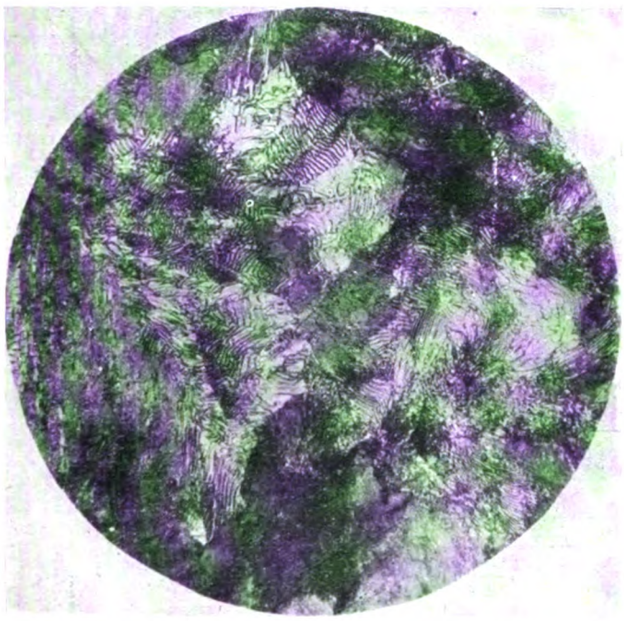

Fig. 1.—Untreated Railway Tyre magnified 250 times,
showing the coarse granular structure of steel in the pearlitic condition.

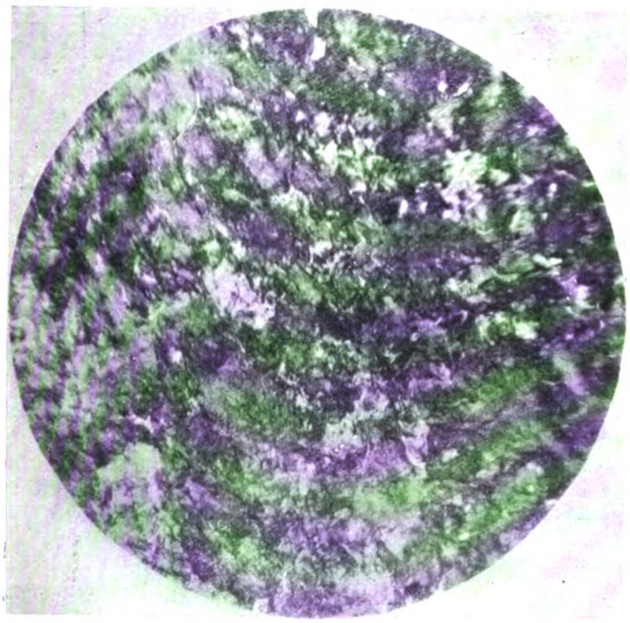

Fig. 2.—Treated Railway Tyre magnified 250 times,
showing the fine grain homogeneous structure of steel in the sorbitic condition.

Tramway engineers, however, are not particularly concerned with obtaining a specified deflection under the falling weight, provided that the tyre withstands a reasonable amount of shock. What they are concerned mainly with is the obtaining of a tyre which is hard and which has a very high elastic limit.

Cars come into the shops for attention to the wheels owing to one or more of three causes, namely—

Flange wear.

Detrusion of the tread due to the steel having been stressed beyond its elastic limit.

Flat spots caused by skidding wheels.

If the steel of the tyre has such a high elastic limit that in service conditions it is not stressed to this amount, detrusion trouble ceases; while increasing the hardness of the tyre reduces the amount of actual wear and also results in the skidding wheel not producing so bad a flat spot as a softer tyre.

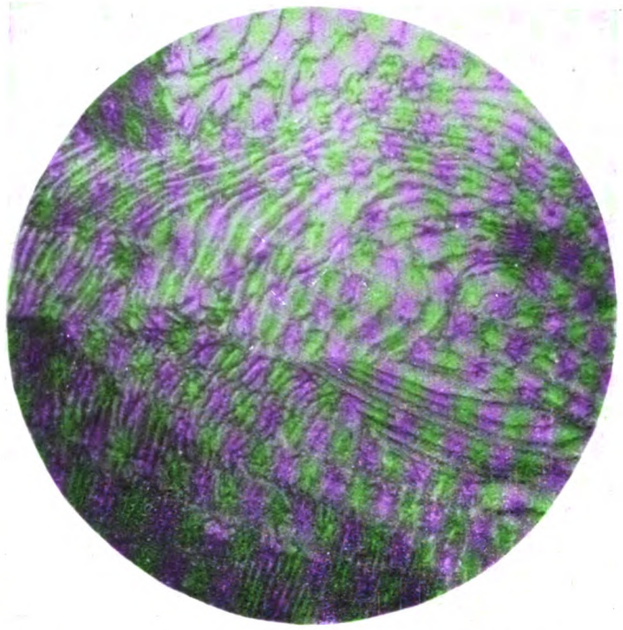

Fig. 3.—Untreated Railway Tyre magnified 1000 times,
showing distinctly the lamellæ of the pearlitic structure.

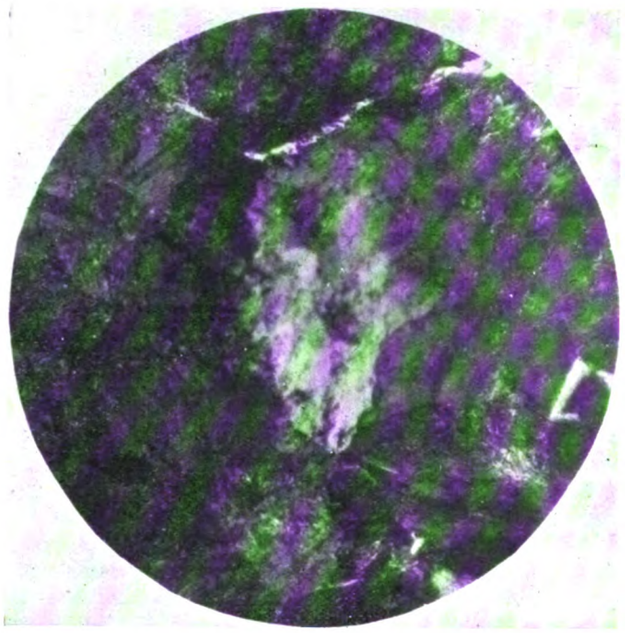

Fig. 4.—Treated Railway Tyre magnified 1000 times,
showing the evenness of the homogeneous structure of sorbitic steel.

With a view to obtaining greater increased life of

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tyres, Messrs. C. P. Sandberg, of 40 Grosvenor Gardens, have been experimenting for a considerable time with their patent process for producing sorbitic steel, and as a result of these experiments tyres can now be offered to tramway authorities with a higher tensile strength and higher yield point than has up to the present been possible.

Medium carbon steels, in the ordinary normalised condition, have, when examined under the microscope, a coarse granular structure consisting of pockets of pearlite surrounded by bands of ferrite or pure iron. The pearlite consists of alternate lamellæ of ferrite and carbide of iron. This pearlitic structure is clearly indicated in Figs. 1 and 3, the first showing the appearance of steel in the tyre magnified 250 times, and the second the same tyre magnified 1,000 times.

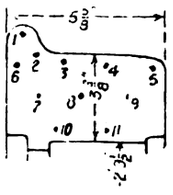
normalised condition gave an ultimate breaking stress of 58 tons after treatment showed an ultimate breaking stress of 76 tons with a yield point of 58 tons, which is the same figure as the untreated ultimate strength. The elongation of 14 per cent. and the behaviour of the tyre under the tup test show that an ample margin of safety is secured.

The second table, referring to a tramway tyre in which the steel had a higher carbon content, shows a breaking stress, after treatment, of 81 tons, while the normalised tyre had a breaking stress of 59 tons.

Still better results have been obtained on tyres which have been ordered by one of the large tramway authorities in this country, when an ultimate breaking stress of 85 tons, with a yield point of 62 tons per square inch, was obtained with ample elongation and

SANDBERG SORBITIC STEEL.—Railway tyres, 2 ft. 9½ in. internal diameter, 5⅝ in. by 3¾ in. section. Analysis—Carbon, ·73; silicon, ·313; manganese, ·74; sulphur, ·033; phosphorous, ·038. All tyres made by the United Steel Company.

Tyre No.	Cast No.	Treatment	Drop Tests 10′	15′	20′	25′	30′	30′	30′	30′		Tensile Test Breaking Stress Tons. [ ] In.	Yield Point Tons. [ ] In	Elongation %	Reduction %
1	6861	Full Sandberg	⅝″	1″	1 7/16″	1 11/16″	2¼″	2⅝″	3 1/16″	3⅜″	Not broken	76·4	58·0	14·0	15·8
2	6861	Cooled in Atmosphere. Reheated to 850° ...	⅜″	1″	1 11/16″	2 5/16″	3 3/16″	4 11/16″	5 1/16″	Broke at Bottom		58·21	—	13·0	18·3
3	6861	Cooled in Atmosphere ...	⅜″	11/16″	1⅝″	2 5/16″	Broke at bottom					57·32	—	10·8	10·08

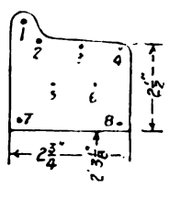


Brinell Numbers. 3,000 kgs. on 10 mm. Ball for 15 secs.

No.	1	2	3	4	5	6	7	8	9	10	11
1	331	311	321	321	331	302	302	302	302	255	269
2	248	248	241	241	241	248	241	241	241	235	230
3	269	252	262	262	269	262	262	255	255	255	248

SANDBERG SORBITIC STEEL.—Tramway tyres, 2 ft. 3⅛ in. internal diameter, 2¼ in. by 2½ in. section. Analysis—Carbon, ·78; silicon, ·322; manganese, ·71; sulphur, ·033; phosphorous, ·036. All tyres made by the United Steel Company.

Tyre No.	Cast No.	Treatment	Drop Tests 3′	5′	7′	9′	11′	13′	15′	Tensile Test Breaking Stress Tons. [ ] In.	Yield Point Tons. [ ] In.	Elongation %	Reduction %
7	8550	Full Sandberg	½″	1″	1⅜″	1 11/16″	2½″	3¼″	Broke	81·2	52·0	13·0	20·2
8	8550	Cooled in Atmosphere. Reheated to 840°	7/16″	1 3/16″	Broke					58·92	—	15·0	23·04
9	8550	Cooled in Atmosphere ...	½″	1¼″	Broke					61·96	—	Broke off close	



Brinell Numbers. 3,000 kgs. on 10 mm. Ball for 15 secs.

Tyre No.	1	2	3	4	5	6	7	8
7	341	341	341	341	321	331	269	285
8	255	255	255	262	241	255	248	255
9	285	269	269	285	269	269	262	285

The heat treatment of steel for the purpose of resisting wear has as its aim the breaking down of the coarse granular structure and substituting a homogeneous structure. This homogeneous structure produced by the Sandberg process is clearly shown in Figs. 2 and 4, which are micro-photographs of the same steel as Figs. 1 and 3 after it had been treated by the Sandberg process. It will be observed that the granular structure has been entirely broken down, the pearlite having been converted into sorbite.

The changes in the structure of the steel obtained by the Sandberg process are accompanied by very decided increases in the tensile strength of the steel and in the hardness. Attention is drawn to the attached tables, which show results of the Sandberg process obtained on tyres of standard diameters.

The first table has reference to railway carriage tyres, and it will be noted that a steel which in the

resistance to shock under the tup test. The Sandberg process is one which may be described as a process of slow quenching. Owing to the simplicity of the process remarkable uniformity in any batch of tyres is obtained. The process consists of cooling the tyre through the critical range of temperature by projecting against it, as it is slowly rotated, very large quantities of air into which atomised water is introduced. The tyre is carried through the critical temperature in some 3½ minutes, and no further heat treatment or re-heating is required.

Tyres of this quality have not been offered to tramway authorities until lately, so that no actual results in service are yet available. In the early days of the process, however, a large number of the railway companies in this country ordered trial lots, and the results obtained on these are most encouraging.

On one electric railway, tyres which in the untreated

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condition had an ultimate strength of 52 tons per square inch, and in the treated condition an ultimate tensile strength of 66 tons per square inch, have shown an increased mileage between visits to the wheel shop for turning of 72 per cent., while on another electric railway the corresponding figure was 70 per cent. These tyres had only an ultimate strength of 66 tons, and it is due to the improvements in the process since the time when the tyres referred to went into service that much higher tensile strengths are now obtainable.

From the standpoint of maintenance costs, the increased life of tyres is of the greatest importance to tramway engineers, as apart from the saving in material, considerable economies are effected in shop labour charges through the less frequent visits of the vehicle to the shops for wheel changing, while greater use of the vehicle itself is obtained owing to its being out of service less frequently; in other words, the earning capacity of the capital asset is increased.

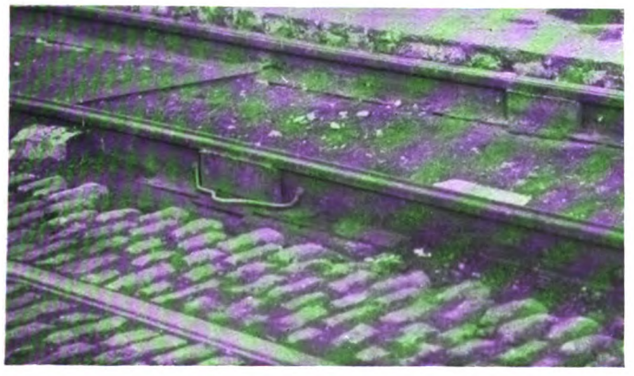
Sorbitic steel is both hard and tough without being brittle, and is therefore well suited to withstand the severe shock and strains as well as the abrasion to which tyres are subject.

It is by the courtesy of Messrs. Steel, Peech and Tozer, Limited, who manufactured and treated the tyres referred to, and to Messrs. C. P. Sandberg, of 40 Grosvenor Gardens, S.W.1, that we are able to furnish our readers with particulars of this important advance in tyre manufacture.

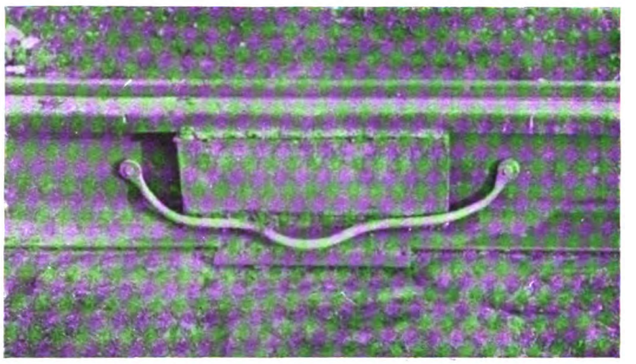
BOLTON'S PATENT TRAMWAY JOINT.

The accompanying photographs show an extremely simple electrically welded rail-joint which is now being used by the Sheffield Corporation. It is the invention of Alderman Bolton, a member of the Sheffield City Council, and has been patented by him.

The short fishplates are rolled to a special section to facilitate the welding, and a very light sole-plate is also welded to the underside of the rails. There is a considerable saving in the weight of metal, no fish-bolts are required, and it is claimed that bonds can also be dispensed with, though (as the photographs show) a single bond has been used at each joint as a matter of precaution. The fishplates are forced into position by a special set of clamps which form part of the patent. Some hundreds of these joints are now in use in Sheffield; before they were tried, comparative tests were made of welded joints built up with ordinary fishplates fastened with nuts and bolts.



Bolton's Patent Electrically-Welded Tramway Joint.



Bolton Tramway Rail Joint.

The tests of the "Bolton" special joint were highly satisfactory, as the attached particulars show.

All the joints used in Sheffield up to the present have been on renewal work. This means that after a joint is made the full service is running over the loose rail probably for two or three days before the track is packed and concreted.

It is difficult to imagine any more severe practical test, and we are assured that not one of the joints has given the least trouble. If a joint will stand this there is not much doubt it will stand the wear and tear of ordinary traffic when properly concreted and paved.

TESTS MADE OF STEEL TRAMWAY RAIL JOINTS AT MESSRS. H. BESSEMER & COMPANY'S WORKS, MARCH 16, 1921.

Weight of Tup.	Bearings Apart.	Fall of Tup in feet.					Remarks.
		2 ft. 6 in.	2 ft. 6in.	2 ft. 6 in.	2 ft. 6 in.	5 ft. 0 in.	
		1st Blow	2nd Blow	3rd Blow	4th Blow	5th Blow	
1 ton.	3 ft. 6 in.	Deflection ⅛ in.	Deflection ¼ in.	Deflection ¼ in.	Deflection ¼ in.	Broken.	One fishplate broken.*

* Bottom plate broken away from flange at one end. Welding along fishplates sound.

"THE PASSIMETER."

NEW TIME-SAVING SCHEME ON THE UNDERGROUND.

There has been installed experimentally at Kilburn Park Station, London (on the Baker Street and Waterloo Railway), a new time-saving system for passenger booking, known as the "Passimeter." The management of the Underground Railways have long considered that both delay and inconvenience arise from the old system of issuing tickets to passengers and the examination and cancellation which immediately follows the issue. The fact that this system has been in operation on railways beyond memory is, the management state, no recommendation to them; their task involves a ceaseless effort to find some new

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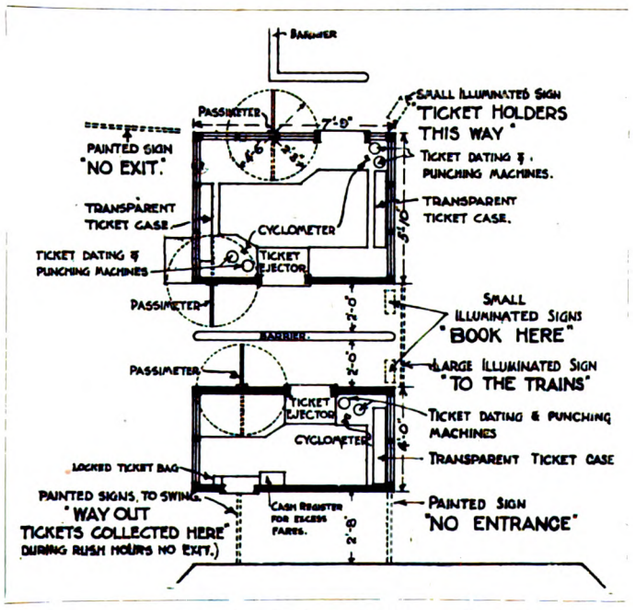
way of "snatching seconds from the maw of time." Where millions of passengers have to be transported daily, mainly in massed rushes during two comparatively short morning and evening periods, any device which may save even a fraction of a second per passenger is worth a trial. Any device which does save it

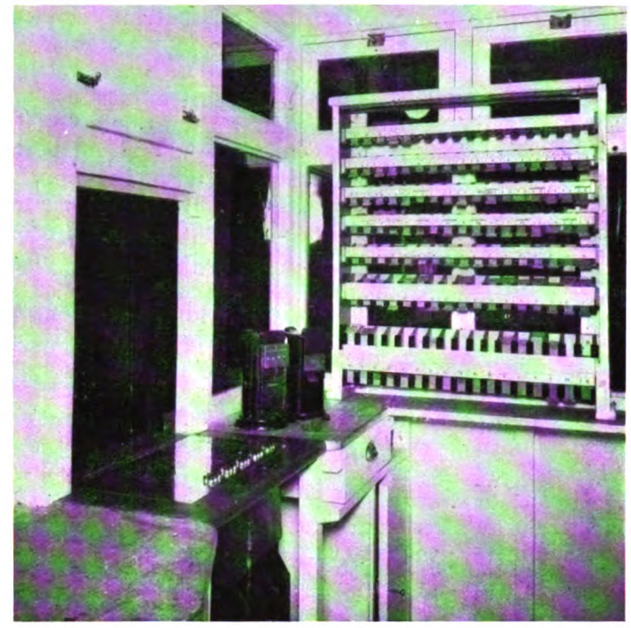
Entrance to Booking Office, showing Passimeters.

assures, in the aggregate, an enormous gain in speed and facility of operation. Many such appliances have already been tried from time to time on the Underground—generally with good results.



Plan of New Booking Offices at Kilburn Park Station, showing Passimeter.

The "Passimeter" system involves the use of three separate registering cyclometers—two automatic, one non-automatic. The first registers the dating and cancellation of each ticket, setting the passenger free to proceed through the "Passimeter." This, as will be seen from the accompanying plan, is really an elaboration of the familiar turnstile, and it operates another cyclometer which automatically records each individual's passage. With the third cyclometer the booking clerk registers the passage of season-ticket holders. From the "Passimeter" the traveller goes straight on to the lift, escalator, or platform, as the



Interior of Booking Office

Showing Ticket-Issuing Machine, Ticket Dating and Cancelling Punches, and New Type of Ticket Case

case may be, without any ticket examination at the customary barrier. Ticket collection is, however, still carried out in the usual way.

It will be seen therefore that a complete record is kept of every traveller who enters the station.

The experimental offices at Kilburn Park Station are also equipped with an "Automaticket" machine similar to that which had been previously tested with success at Leicester Square Station, and which was illustrated and described in our issue of May 19, 1921. Local tickets, which represent 75 per cent. of the issues, are delivered from this machine by a very simple method. With the mere pressure of a small plunger, like that of an electric bell-push, the booking clerk can issue any number of tickets up to five of any one denomination. The machine can thus deliver five tickets just as quickly as one, and far more speedily than one ticket can be issued in the ordinary way. The system promises a great simplification, for instance, of the evening theatre bookings by parties.

The combined "Automaticket" and "Passimeter" booking office at Kilburn Park is designed to provide comfortable quarters for the booking clerk, and by careful attention to detail in construction every available inch of space has been put to use. The ledger desk, it may be instanced, is made to the exact size of the ledger. There is no waste space, and a stock of 250 different kinds of tickets is located so that all are within easy reach of the clerk. Experiment is also to be made with steel ticket-cases in place of the ordinary wooden holders, with a view to further space saving and greater cleanliness. If the tests now being made at Kilburn Park prove satisfactory, the scheme will be extended to other stations on the Underground.

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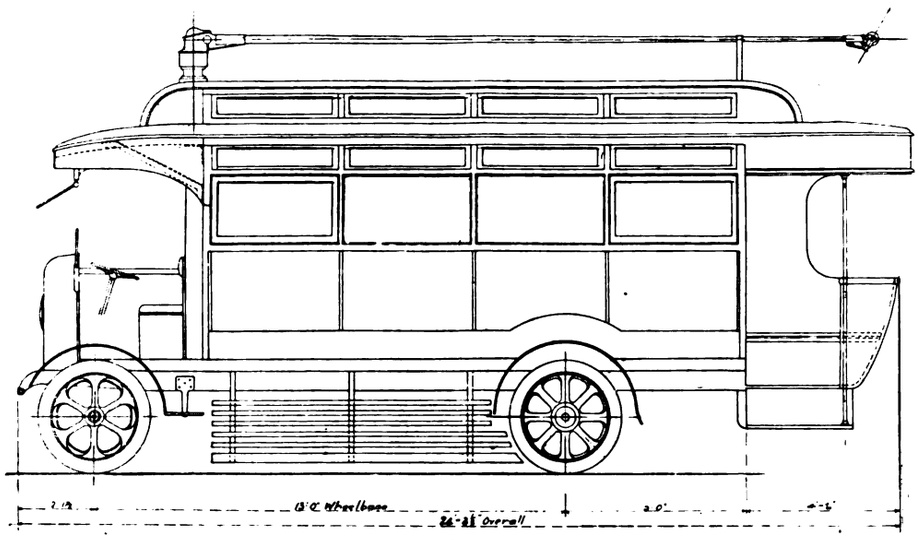
NEW RAILLESS OMNIBUSES FOR BLOEMFONTEIN CORPORATION.

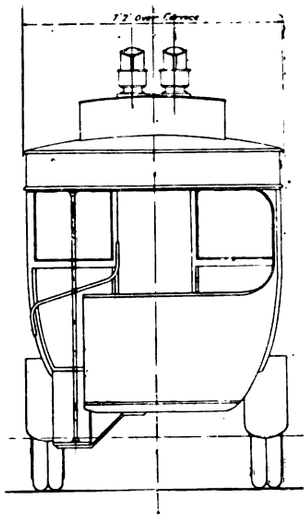
The first of the new railless cars which Railless, Limited, are constructing for the Bloemfontein Corporation has just been completed, and by the courtesy of the contractors a number of those interested in the development of trolley omnibuses were given an opportunity on January 13 of inspecting the car and testing its running. By the courtesy of the Leeds Corporation the omnibus was run over their railless route, and it is no exaggeration to say that the party were greatly pleased with the smooth riding and ease of control which characterised the new machine. There is no doubt that these vehicles attain a very high standard of comfort, power, and reliability, and are admirably adapted to meet the conditions of service for which they are designed. The general design of the car will be readily understood from the accompanying illustrations. There is ample seating room for 30 passengers, ten seats each accommodating two passengers being arranged across the vehicle, with a gangway through the centre, while there are seats for five passengers who sit at the front of the saloon with their backs towards the driver's compartment. The platform, which is of novel design, has a seat arranged on two sides with accommodation for five passengers.

The body, which is of light but substantial construction, is 15 ft. in length over all, and the width at the waist rail 7 ft. 1 in. over the panels. The height from the inside of the roof to the floor is 6 ft. 3 in., and the height from the road to the rear platform approximately 2 ft. 2 in., and from the road to the car floor 2 ft. 10 in. The underframe rests upon two sole pieces of teak laid the full length of the chassis side members, from which they are insulated by a thick layer of Mascolite felt which prevents the transmission of noise and vibration to the body. The underframe is constructed of teak, carrying floor boards of white pine with pitch pine slats. Down the centre of the vehicle, between the seats, trap doors are provided above the commutator end of the motors and over the worm case inspection covers. The stand and corner pillars are of teak. The roof, as will be seen from the illustration, is of the clerestory type, and the roof sticks are stiffened by means of carlines screwed to their sides. Roof boards of pine matchboarding, covered with canvas, are trussed by steel rods, which serve as hand rails. The front dash and wings are of 18 gauge steel, as are also the external panels. Ample provision has been made for ventilation, for in addition to the fixed windows there are two drop windows on each side of the car. In the front bulkhead there are two fixed windows. The glass of all the windows is bedded on rubber, and the drop windows are balanced on lazy tong fittings. The body has been so constructed that these drop windows can be removed without dismantling the side panels. Hinged ventilators are placed above the side windows, and are so arranged that alternate ones will open. In addition, hit and miss ventilators are fitted at each end of the car.

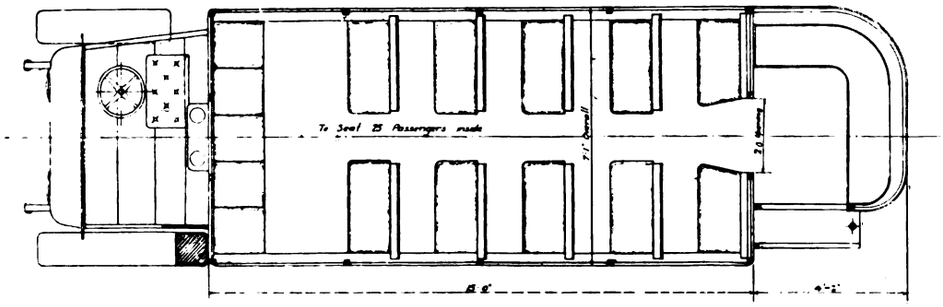
The driver's platform, the arrangement of which is shown in one of the illustrations, is provided with a wind screen of the ordinary motor car type, which is attached to the body by a removable panel on the driver's right. Space under the driver's seat is utilised as a tool locker. The entrance to the vehicle is at



SIDE ELEVATION.



REAR ELEVATION.



PLAN.

New Railless Omnibus for Bloemfontein Corporation.

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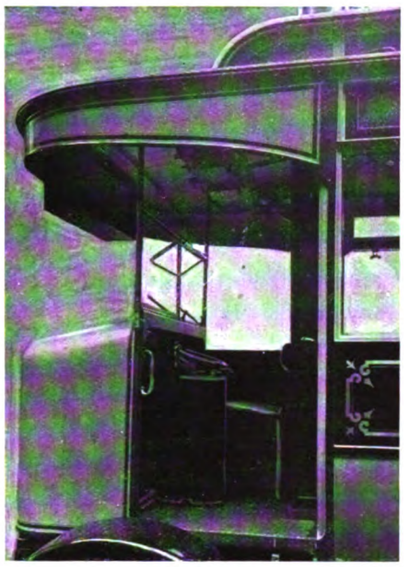
the rear, and the saloon has no door. When the car is fully loaded, the conductor's platform is 2 ft. above the level of the road, and there is only one step, which is fitted with a non-slip tread plate. The platform is supported by teak bearers fitted on the side members of the chassis extension frame. The floor is constructed of pine tongued and grooved boards laid transversely and covered with pitch pine slats.



Driver's Platform.

Rear View.

New Railless Omnibus for Bloemfontein.

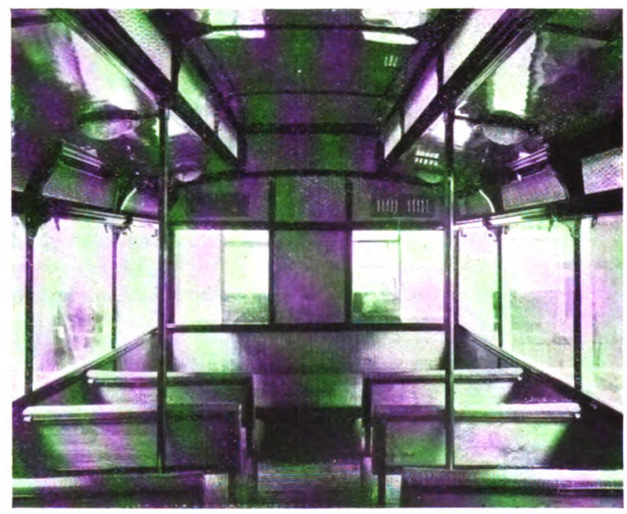
As previously mentioned, the seats are arranged transversely, and the side standards of the seat backs are rigidly secured to the waist rail. Padded spring backs trimmed with rattan are fitted. Spring roller blinds are provided in the front bulkhead on the outside of the body, and spring roller blinds of pantasote are fitted to screen all windows.

The car is wired for 15 lights as follows—Dash lamp, 2; front destination indicator, 2; rear destination indicator, 2; interior of car, 8 (one acting as a front signal light and one acting as a rear signal light); and there is one light on the conductor's platform. All lamps are arranged in three circuits, each circuit being equipped with two switch fuses and five 100-volt metallic filament traction lamps. An electric signal bell is provided, and bell pushes with metallic covers are placed in suitable positions. Destination indicators are built on the ends of the framing of the body.

The chassis is of special design, and is constructed of pressed mild steel channel, the frame being stiffened by cross members between the side members. The rear extension frame supporting the conductor's platform is riveted to the side members, and secured by substantial brackets to the rear cross members of the chassis frame. Springs are of oil-hardened ground spring steel of best Sheffield manufacture. The rear springs, of special design of Railless, Limited, are fitted with supplementary rubber springs of a novel and remarkably effective design on the top of the main laminated bearing springs. These auxiliary springs come into action with the full and overload. The torque is taken on the springs. One of the most arresting features of these vehicles is the fitting of rubber shock absorbers in the spring hangers of the rear springs. This innovation presented considerable difficulty, which has been overcome in a remarkably effective manner, as was proved by the easy riding of the vehicle over a stretch of very rough road.

The front axle is a solid steel forging. Vertical pivots are fitted with ball thrust washers, and are oil lubricated. Stub axles are bushed with hardened steel bushes to take the pivot point.

The vehicle is capable of being turned in a radius of approximately 12 ft. measured on the track of the inner rear wheels. The steering wheel is covered with exonite, with special hand grips moulded on the under side. The steering gear is of the worm and sector type, with case-hardened steel worm and phosphor bronze sector contained in an oil-tight and dust-proof cast steel case. The rear axle is of the live axle type, each road wheel being driven by a separate motor through worm reduction gear. The worm wheels are of the best phosphor bronze, and the worms of special steel case-hardened and ground. Roller journal bearings, ball bearings, and ball thrust bearings are used throughout. The rear road wheels are mounted on phosphor bronze floating bushes in two parts. The worm gear shafts and bearings are



Interior looking towards the Front.

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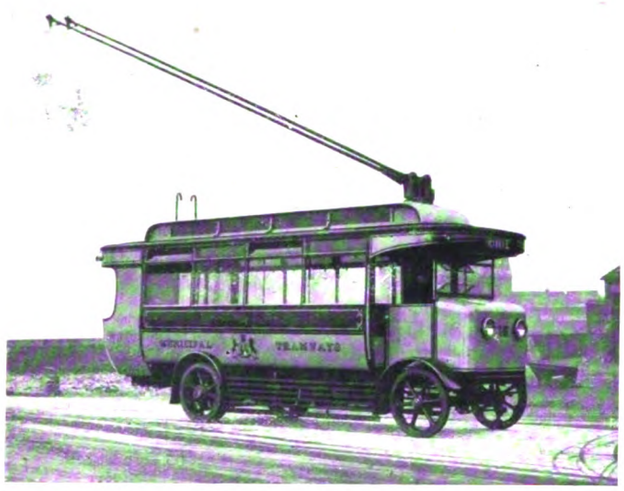
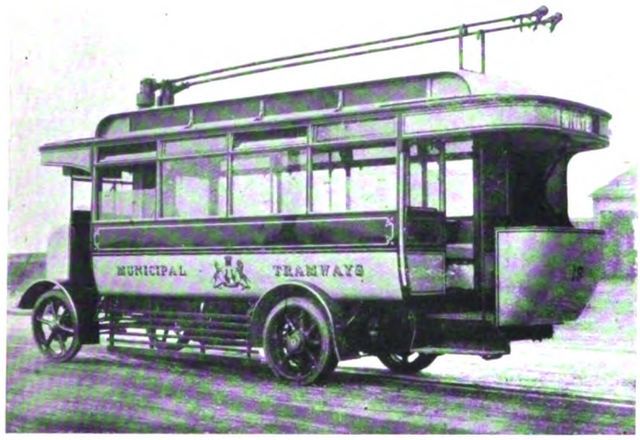
enclosed in an oil-tight dust-proof steel casing so constructed that the bearings and gear can be inspected without lifting the vehicle. The worm shafts are fitted with centrifugal oil throwers to prevent the oil from working out to the front end of the worm shaft, and there are arrangements for the oil to drain back into the bottom of the worm casing. The road wheels are of cast-steel with hollow spokes, with a rim diameter of 771 mm. for 120 mm. Dunlop solid rubber tyres. Single tyres are fitted to the front wheels, and twin tyres to the rear wheels. There are two independent brakes, each of which is capable of controlling and stopping the vehicle when fully loaded on a 1 in 10 gradient. The rear wheel brake is of the internal expansion type, operated by a cam by means of a foot pedal from the driver's platform. Compensating links ensure equal pressure on each wheel brake. There is a light dust-cover over each brake drum, enabling the brake shoes to be readily inspected. This brake can also be operated by a hand lever with ratchet for retaining the brake on after application by the foot pedal or hand lever. The external contracting brake is fitted at the driving end of each motor shaft, and is operated by a foot pedal. It is of a powerful type, and is designed for use in case of emergency. The shoes on both brakes are lined with Ferrodo, secured with aluminium rivets. Adjustable nuts are provided on the pull rods to take up the wear.

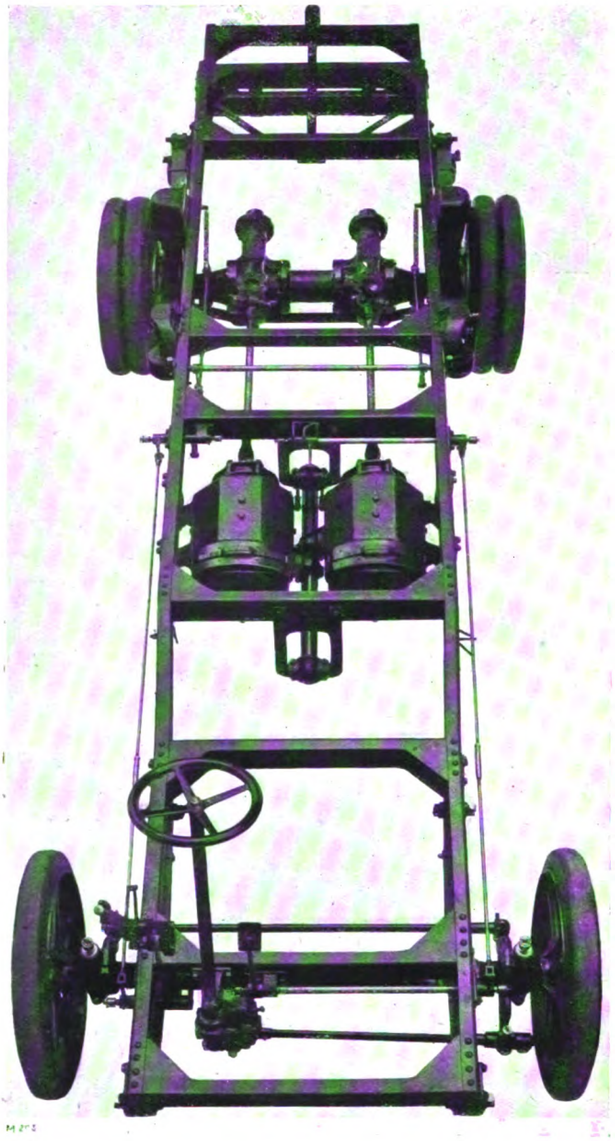


Front and Side View.



Side and End View of Bloemfontein Railless Car.

The vehicle is fitted with two electric motors, each having a capacity of 20 B.H.P. on tramway rating at 1,000 revolutions per minute on a 525-volt circuit. The motors are series wound with four main poles and four commutator poles and are arranged for shunt field control. The motors are totally enclosed by the magnet ring and two end shields. The bearings are carried in the end shield, and are provided with Skefko ball bearings and Hoffmann thrust bearings. The controller, which consists of a main and a reversing barrel, provides for forward and reverse running, and for connecting the two motors in series or in parallel. Provision is made also for shunt field control and for cutting out either motor by controlling the other on the series notches. Only the reversing handle is detachable, the power handle being fixed. The main barrel cannot be moved from the off position unless the reversing barrel is in one of the operating positions, while the reversing barrel cannot be moved unless the



Plan View of Chassis.

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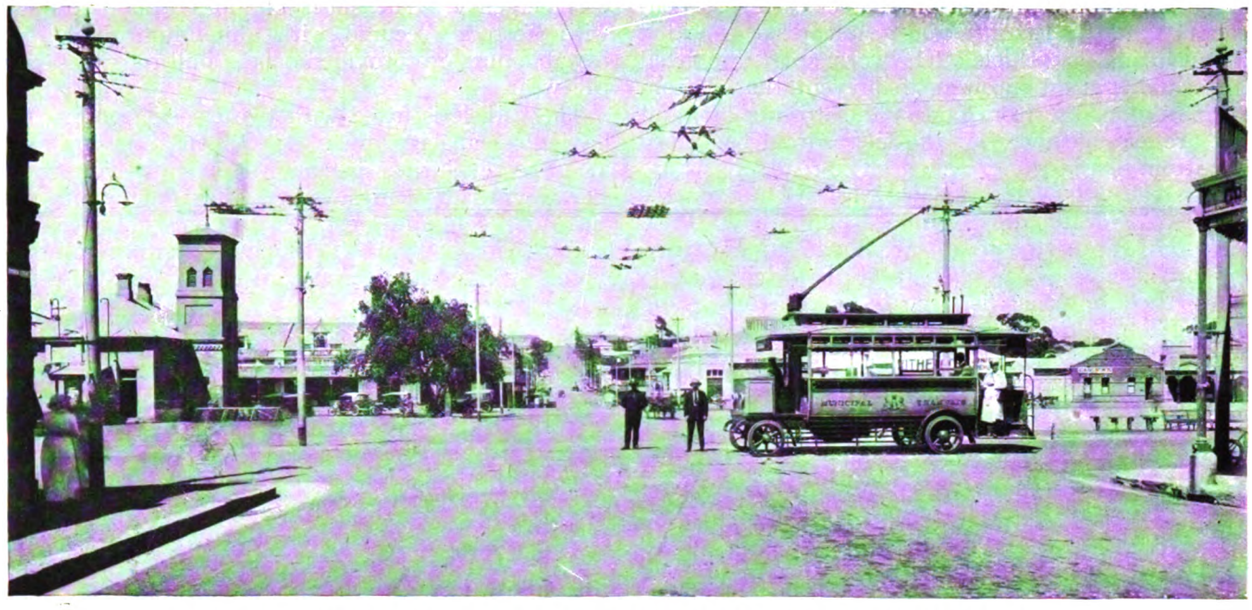
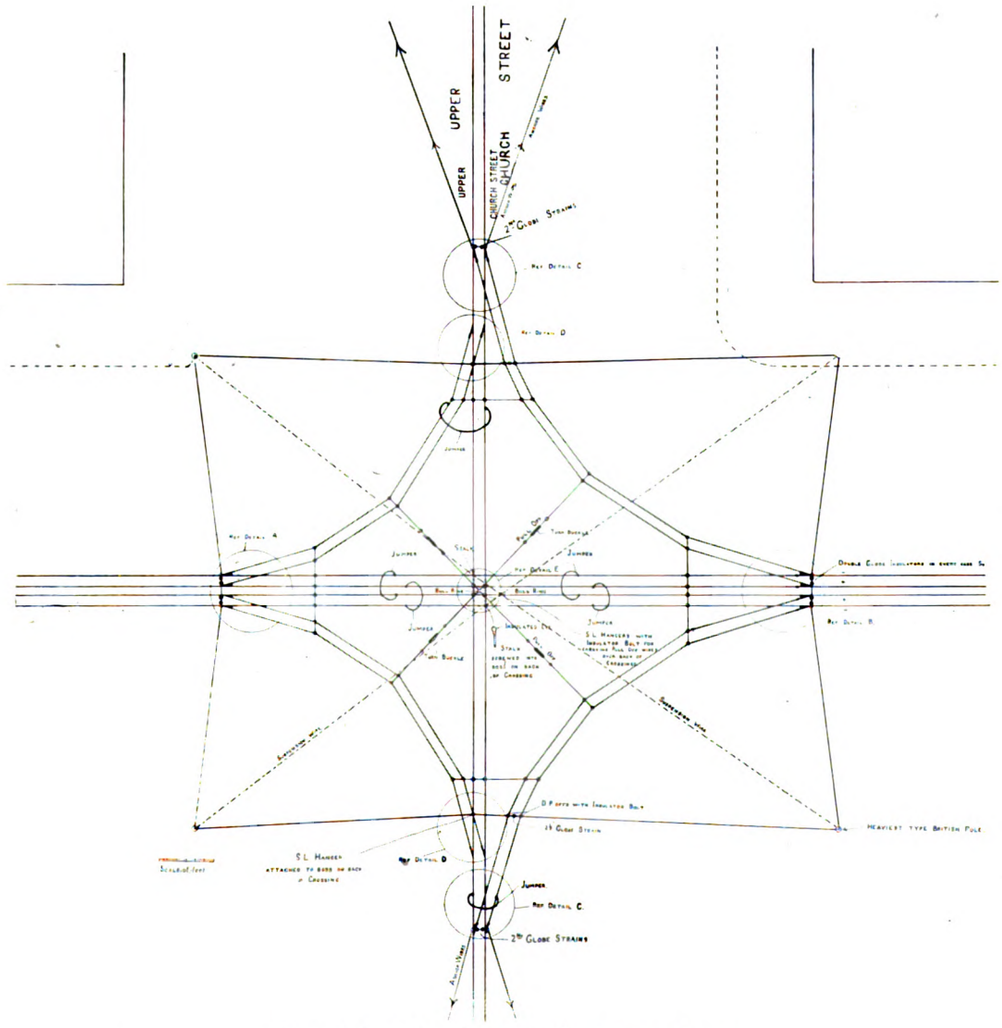


View of Overhead Work at Market Square Junction of Railless Routes at Bloemfontein.



Plan of Junction shown in Illustration above.

JUNCTION OF RAILLESS OMNIBUS ROUTES AT BLOEMFONTEIN.

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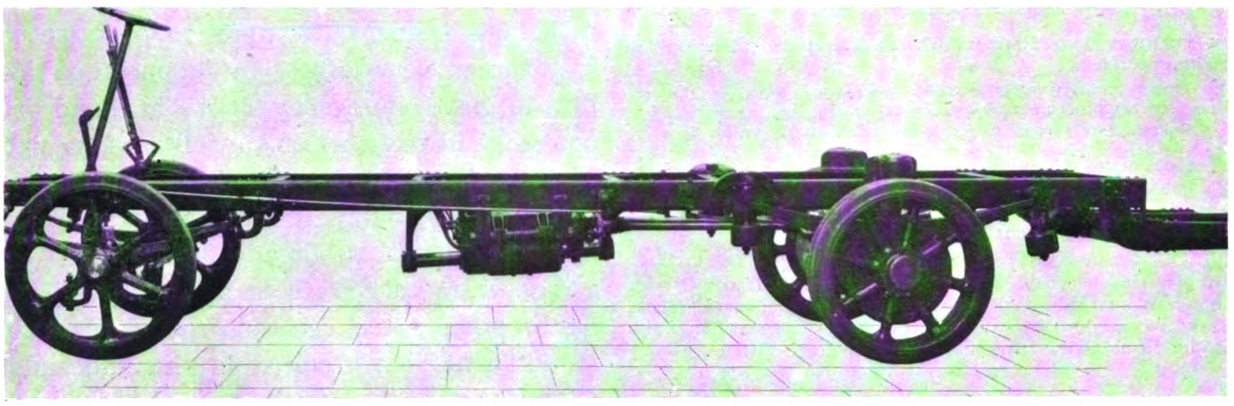
main barrel is in the off position. The main barrel gives nine positions in addition to the off position, five series and four parallel, and the reversing barrel a forward and a reverse.

The controlling resistances in the motor circuits are of the E.M.B. steel grid type. Circuit breakers are of the standard traction pattern, fitted with overload release and magnetic blow-out. The two trolleys are of the Railless patent cam-control type, fitted with ball and roller bearings. These unique trolleys enable the vehicle to deviate on either side of the trolley wires to the full length of the trolley poles without risk of dewiring at any speed.

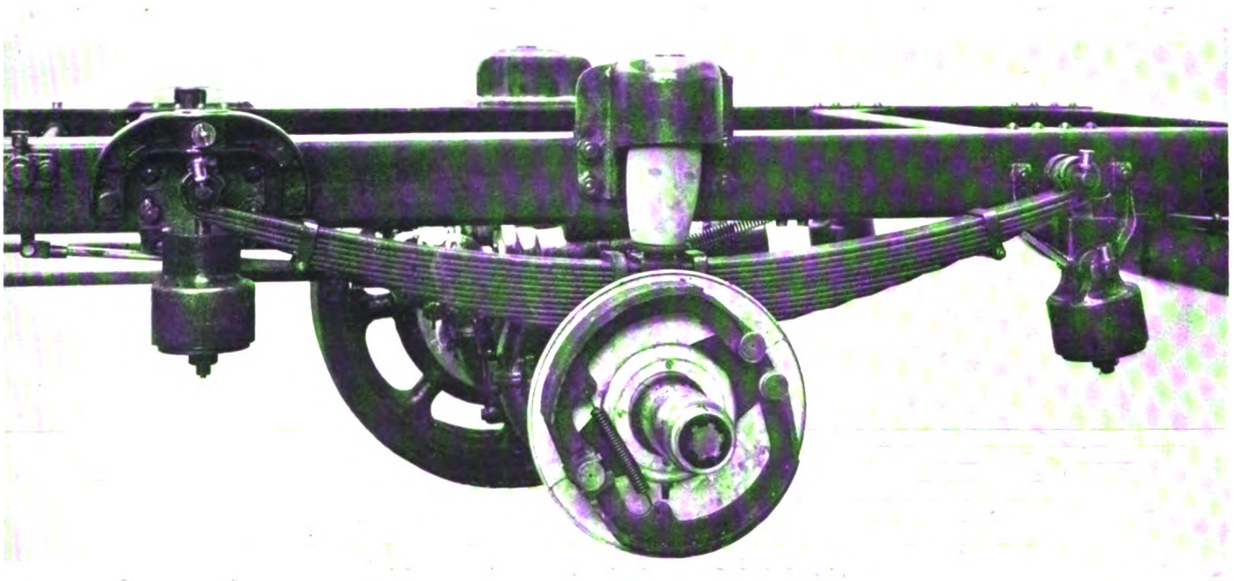
The overhead wiring equipment of the Bloemfontein system was carried out generally upon the standard practice of Railless, Limited, with a double pair of wires, one pair for each journey (outward and return), with treble insulation employing standard tramway overhead line fittings. There is, however, in this installation one feature of the overhead equipment deserving more than passing comment. This is the wiring in the Market Square. Here it was necessary to carry the double overhead wiring across the single pair of wires traversing the length of upper Church Street, and to form curves and junctions connecting each of the four streets converging on the Market Square, so as to make it possible to run straight through on either side, or alternatively to run from one street to the street at right angles on all the four corners.

The plan here reproduced is a copy of the actual plan supplied to the erecting engineer, and shows the general layout. The four junctions are shown, as also is the central crossing accommodating six trolley wires, which is seen in the middle of the plan. The insulated fittings, crossings, frogs, and points were all of the special design of Railless, Limited, and it is satisfactory to record that no trouble has ever been experienced with them. Although this work represents one of the most complex pieces of wiring that has yet been accomplished, the report of the erecting engineer after six months' operation stated that not a single trolley wheel had left the line, either at the Market Square junctions or at any other portion of the route.

In a subsequent issue we hope to describe in detail the actual construction of the various fittings employed.



Side Elevation of Chassis of Railless Omnibus for Bloemfontein.



Arrangement of Springs at Rear Wheels.

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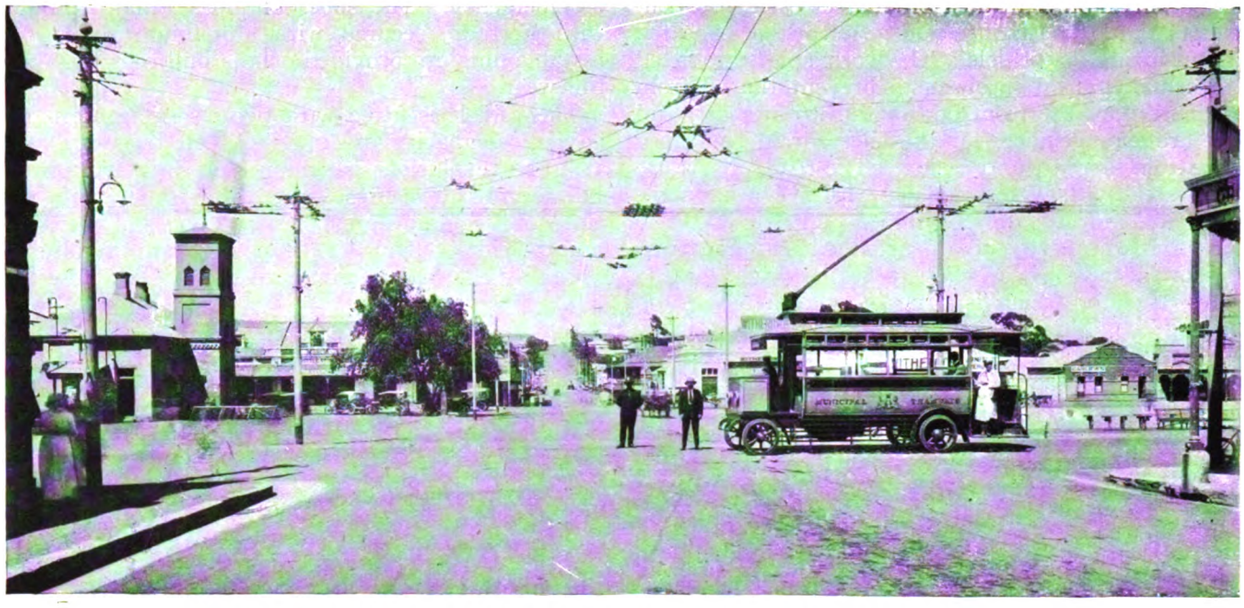

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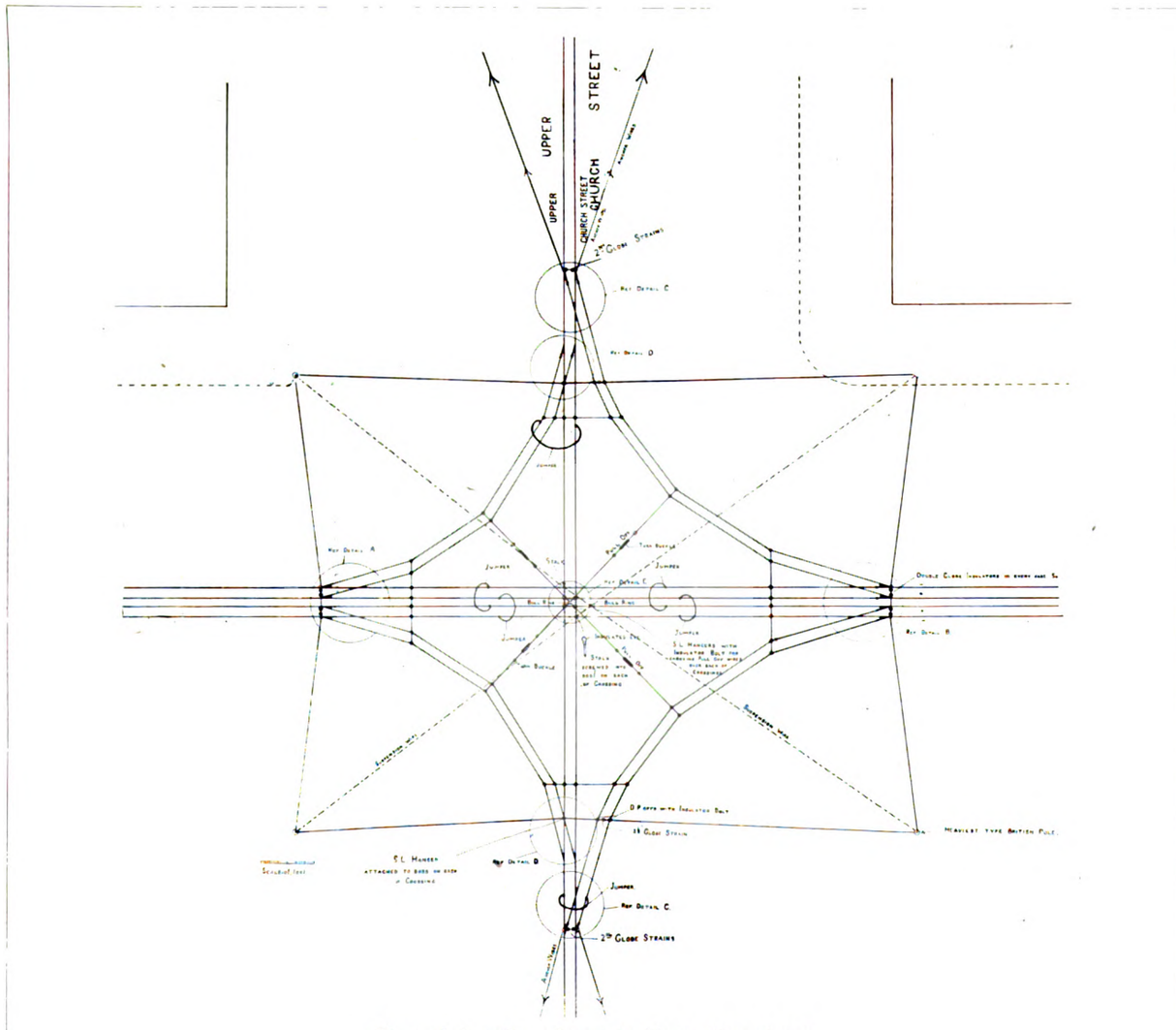

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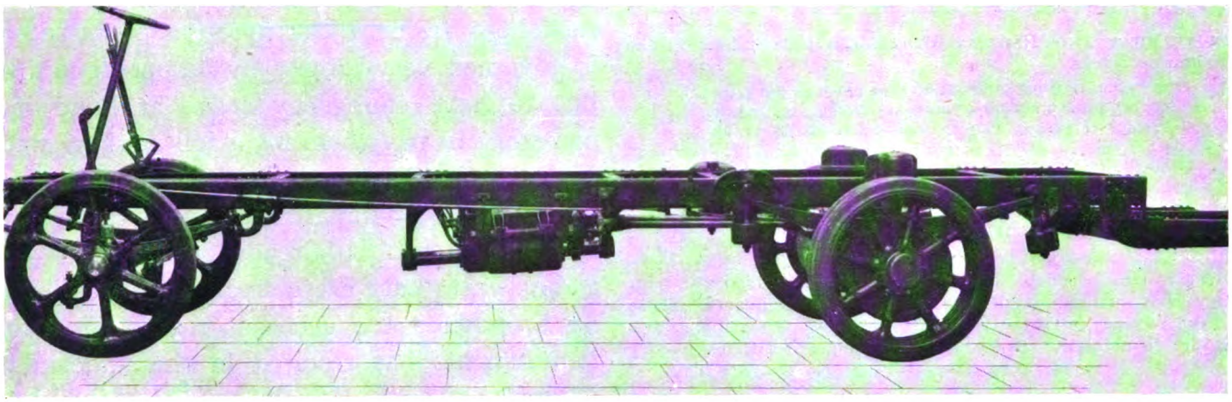

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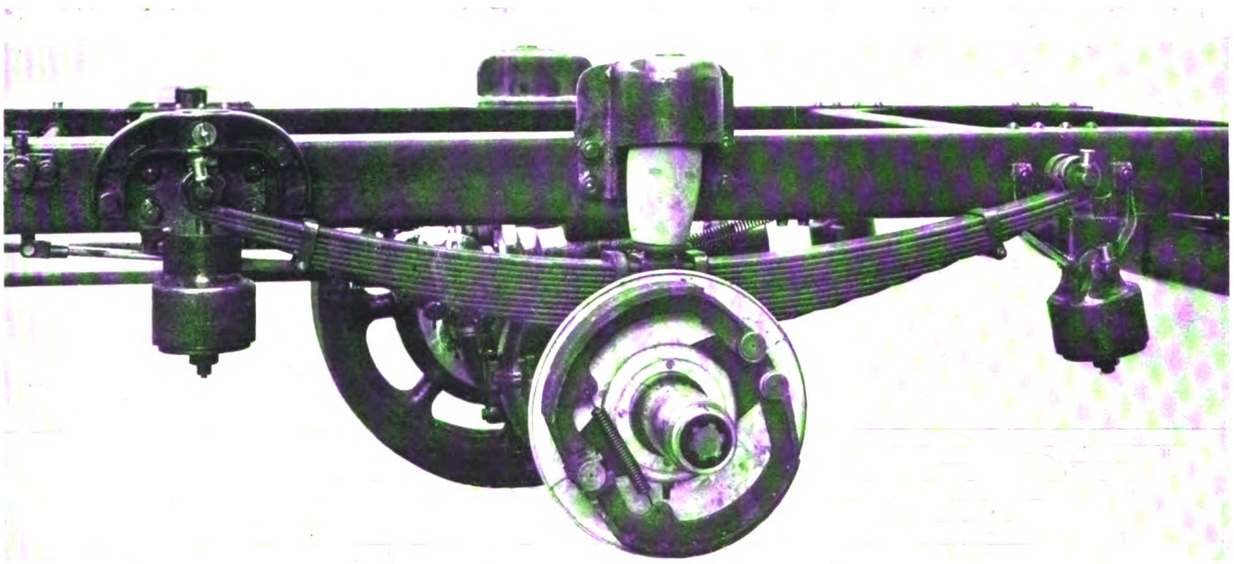

Arrangement of Springs at Rear Wheels.

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THE EDITOR will be glad to consider articles by experts. All information of a practical character relating particularly to the engineering and operating branches of transportation will receive prompt attention. Original illustrations will also be welcome.

LONDON, JANUARY 19, 1922.

Adjustment of Hours. From the Government down to the agricultural labourer the country has had to realise that it is impossible to have in all respects "a land fit for heroes." Universal sympathy attended the efforts that were made after the war to bring Utopian conditions into existence, but in nearly every direction disillusion was inevitable. The mistake was made of seeking too much in a world made nearly bankrupt by war. It is now generally recognised that improvements can only be effected gradually, as economic conditions permit. The traction industry was one in which a mistake was made by unwarranted generosity. Not only was the eight-hour day universally conceded, but this was restricted within a too limited spreadover. In other directions also innumerable difficulties have arisen since the ratification of the national agreement in the tramways industry in March 1919. Hence the fact that arbitrations have had to be conducted on disputed points. With the present spreadover the undertakings have found it impossible to provide efficiently for the public requirements. The fall in working costs proceeds but slowly, and it is to be feared that when the financial year ends on March 31 the results will be found to be as unfavourable as these of the year ended March 31, 1921, when thirty undertakings had to call upon the ratepayers to make good the losses incurred. Two instances of the difficulties attendant upon the restricted spreadover and the wages of spare hands may be quoted as typical. At Leeds the department is hindered in dealing with the rush hour traffic. The question of extra cars is governed very largely by labour conditions, but to have emergency crews at hand it is necessary to pay them for a full working week. Their employment on extra cars at rush times would not approximate to a full week, and as the department is already losing over £150 a day, extra cars are a financial impossibility. At Croydon a too generous regard for public requirements has resulted in the undertaking paying £38 per month to men for doing "nothing." That Tramways Committees are desirous of ending this financial burden by means of a revision of the national agreement is not surprising. The omnibus workers of the country have already, on the advice of their organisers, assented to revision, and it now remains for tramway employees to meet the difficulties of the times with good will.

Accidents at Stopping Places. The question of accidents to passengers at tramway stopping-places is raised again by the action of the London County Council. The remedy which has been suggested in various places is to impose a by-law obliging the driver of any vehicle desiring to pass a stationary tramcar on the near side to pull up while any passengers are leaving or entering the car. It has long been known, and the Highways Committee of the County Council confirm the fact, from their own inquiries, that the driving of vehicles past stationary cars on the near side is the cause of many accidents. The committee conferred with the Minister of Transport on the subject last year, but he thought it doubtful whether he had power to sanction such a by-law as that proposed, and that in any event it was unlikely that he would consider it desirable to do so. The necessity of securing greater safety at stopping-places was represented to the Ministry last autumn by the Municipal Tramways Association, and the London County

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Council are fully justified in calling official attention to the increase in the number of accidents, and asking what steps it is proposed to take to safeguard the public. Within recent time several English municipalities have unsuccessfully tried to get powers to prevent vehicles from running in among passengers at stopping-places. The only case where a by-law for the purpose seems to be in existence is Glasgow. Under a private Act passed some ten years ago the Corporation secured wide powers to make by-laws, and in 1915 they made one obliging drivers of vehicles on the near side to pull up at tramcar stopping-places so long as passengers are leaving or entering a car. The by-law was sanctioned by the Sheriff of Lanarkshire and confirmed by the Secretary for Scotland. No particular complaints as to its operation appear to have been made, and there seems to be no reason why it should not work successfully in the large provincial towns of England. In the case of London, however, there is great strength in the contention that such a by-law would create intolerable street blocks. The volume of general traffic on the main thoroughfares of London is so great, as compared with that in any other town, that the by-law would be likely in some places at least to produce an almost perpetual hold-up. At some points there is a car at the stopping-place most of the time. Moreover the traffic coming in the opposite direction is often so great as to make impracticable the alternative of vehicles passing the car on the off side. The near side is frequently impeded by omnibuses stopping at or near the places where the cars stop, and that also is a feature either absent or much less pronounced in other towns. A satisfactory solution for London will not easily be found, but the increase in accidents must be prevented. Undoubtedly the danger can be greatly minimised if drivers of motor vehicles take greater care and recognise that pedestrians have a perfect right to the use of the roadway when entering or alighting from tramway cars. This is a remedy that can be immediately applied, and from all points of view it would be preferable to the imposition of any hard and fast rule creating fresh interference with the movement of street traffic.

Awards to Employees. The action of the London County Council in approving a scheme submitted by the general manager of the tramways for awarding prizes to employees who make practical suggestions for devices likely to be of advantage will be generally welcomed. Awards will be made by an examining committee consisting of the general manager and the heads of the five branches of the tramway department. The total amount to be distributed—£200 a year—is not large, but the payment in each case is to be determined by the merit of the suggestion. If the scheme works well the Council may, of course, in the future find it desirable to increase the amount of the prizes. There seems to be no reason why the scheme should not work well. It is already in operation on some British railway systems, and has from time to time resulted in the production of useful improvements. Moreover, it gives encouragement and excites the interest of employees who are of an inventive or mechanical turn of mind; and in this way tends to reduce the monotony of routine. It helps to a realisation of the fact that they may be proud of the great undertaking with which they are connected. In large tramway systems the scheme should be more productive than in the case of small undertakings, because the larger the number of employees the more chance there is of latent talent being found. But even the smaller undertakings may have in their employment men who, finding practical difficulties in their everyday work, may have the ingenuity to devise remedies for them. If there is no system of awards, no mental incentive, then it may well be that "many a flower is born to blush unseen." A scheme of the sort costs little, and such expenditure as is incurred may be repaid a hundredfold.

Overhaul of London Cars. Tramway undertakings within the Metropolitan area are subject to various disabilities which do not apply to tramways in other parts of the country. One of these is the requirement of the Commissioner of Police that all cars must be painted and varnished once a year. This has to be done before they are presented for the annual renewal of their licences. The time required for painting is also used for the general overhaul of the trucks, electric equipment etc. It seems that experience

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has shown that generally it is not necessary to have a complete overhaul of the mechanism as often as once a year, seeing that ordinary running repairs and adjustment are regularly carried on. The London County Council are accordingly making representations to the Home Office, which is the department governing the Metropolitan Police, to the effect that renovation and overhaul should be done on a mileage basis, as in the case of railways. Expert advice to the Council is that it would be sufficient to carry out such work on the completion of each 75,000 miles, which would give an average time between overhauls of about two years. This would effect a saving in labour of £35,000 a year, and an ultimate saving of £175,000 on capital expenditure, as fewer cars would be required. If all this money can be saved, it is clearly not worth while to spend it merely in order that the woodwork of the cars should always be resplendent in new paint and varnish. These external coatings might stand for two years without becoming unsightly. In other parts of the country the local authority has freedom to regulate times of painting as it likes, and surely the same discretion should be left to London tramway managers. The London General Omnibus Company has to submit to the same regulation regarding annual painting of omnibuses, and at that time general overhaul of the vehicle is also carried out. It seems probable, however, that in any case an omnibus will require overhaul more frequently than a tramcar, as it is subjected to much greater vibration, that it has a high speed reciprocating engine, and gearing that is subjected to great and constant strain.

THE AGREEMENT OF MARCH 1919.

SUB-COMMITTEE TO CONSIDER REVISION.

The National Joint Industrial Council for the Tramways Industry met at the Ministry of Labour on December 15 and considered the resolutions passed at the conference of municipal tramway authorities on December 9, and reported in our issue of December 15. One of these resolutions asked for the appointment of "a special committee to consider and revise as a matter of urgency the whole of the terms of the March 1919 agreement."

The employers' side of the Council intimated that they had no desire to interfere with the normal working week of 48 hours, and that the reports of an attempt to establish a 54-hour week were incorrect. They stated that difficulties had arisen from the guaranteed week of 48 hours, which in practice had been found inadequate to meet the varying needs of the efficient operation of tramways.

The trade union side pressed for adherence to the guaranteed week, and stated that only on that condition could they agree to remit to a committee for consideration and revision the other clauses in the agreement. They were, it is understood, opposed to a system of "spread-over" duties, even although the normal 48-hour week might still be recognised.

The following is the text of the resolution passed unanimously—

"That, subject to the reservation that the normal working week shall consist of 48 hours, a special committee be appointed to consider the revision of the agreement of March 1919; the report of the special committee to be presented to the monthly meeting of this Council to be held in February 1922; any proposed revision of the agreement to be subject to the approval of the constituent employers and employees."

Upon the proposal by the employees' representatives that time and a half rates be paid to all employees called upon to work on Tuesday, December 27, it was resolved that the matter should be left to the decision of each individual undertaking.

Tramway companies, after careful consideration of the present position, gave notice on December 13 to terminate the agreement.

The full text of the agreement of March 1919 was given in full in our issue of April 10, 1919.

CORRESPONDENCE.

"THE TROLLEY-OMNIBUS."

To the Editor of THE TRAMWAY AND RAILWAY WORLD.

Sir,—With reference to Mr. C. B. Nixon's further letter appearing in your December issue, I am pleased to note a gradual weakening in his antipathy to the trolley omnibus, and that he now admits "that there are not a few special circumstances where the trolley omnibus might be indicated in preference to petrol omnibus." This admission is, however, qualified, "but I submit that these instances are extremely rare." Where electric power can be purchased in bulk for a sum not exceeding 2½d. per unit, and given a service of not less than 15 minutes, or, alternatively, with current at 1½d. per unit and say a 30-minute service, there is no petrol vehicle that can possibly operate so economically as the trolley omnibus. Would Mr. Nixon claim that instances of purchasing current at the above-mentioned rates are extremely rare?

With regard to Mr. Nixon's claim that trolley omnibuses cannot be overloaded, the most recent trolley omnibus in operation in this country, and having a seating capacity for 36 passengers, is carrying up to 65 passengers during rush periods of the day, and at an average cost for electric power of under 1d. per omnibus-mile. Does this not compare favourably with the petrol omnibus?

With regard to the speed of this type of vehicle, this is only limited by the size of electric motor as fitted, and the capacity of the generating station from which the electric power is obtained.

One has only to instance the speed of our electric railways, or London underground tubes, and to consider the alternative of driving such trains by means of petrol engines, in order to arrive at a conclusion regarding the capabilities of the electric motor in this respect.

Yours faithfully,

For CLOUGH, SMITH AND COMPANY, LIMITED,
N. CLOUGH, *Director*.

36 Victoria Street, Westminster, London, S.W.1,
December 23, 1921.

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ELECTRIC TRACTION IN CHINA.

By J. G. Smeaton
(*Late Deputy General Manager, Shanghai Tramways*).

With the eyes of the world centred on the epoch-making conference at Washington, it is inevitable that China—the crux of the Pacific problem—should be very much in the foreground at the moment. It is, however, perhaps not sufficiently realised, in this country, that if the conference succeeds in its efforts to achieve stabilised conditions in the Pacific, China, at present an important market, will almost certainly become one of the world's largest purchasers. The idealism of the United States in this connection coincides with her business interests, and just as soon as the present internecine troubles in China are adjusted—probably by sympathetic foreign intervention—a keener scramble than ever for new markets, under the latest "open-door" policy, will begin. The aim of this article, however, is not to deal with the trend of political happenings upon the general economic situation in China, but to try to indicate briefly the prospects of development of electric traction.

The writer was connected for fourteen years with the highly successful system of tramways operated in the foreign settlement at Shanghai, and perhaps a few particulars regarding that system may be read here with interest. The Shanghai Electric Construction Company, Limited, was formed in London in 1906 with a capital of £320,000 for the purpose of constructing and operating a system of overhead electric tramways in the foreign settlement at Shanghai under a concession granted by the Shanghai Municipal Council to Messrs. Bruce Peebles and Company, Limited, of Edinburgh—the latter firm subsequently carrying out the contract for the construction of the system. The lines, measuring about 16 miles of route—9 miles double track and 7 miles single track—were opened for traffic in March 1908, and the original equipment of rolling stock consisted of 65 motor tramcars of the single-deck type. The difficulties in the way of financial success in the early days of operation—the proverbial conservatism of the Chinese, unrestricted and cheap rickshaw competition, depreciated subsidiary currency, and the low earnings of the vast majority of the natives—seemed well-nigh insuperable. These difficulties, however, were gradually overcome, and the following figures indicate the remarkable progress which has been made under the able administration of the company's general manager in Shanghai—Mr. Donald McColl.

		1909	1920
Population (foreign settlement)		494,000	783,146
Length of track (route miles)		16¼	17¾
Rolling stock	motor tramcars	65	90
	trailer tramcars	-	85
	railless cars	-	7
	Total	65	182
Car-miles run		1,979,001	4,875,562
Passengers		11,772,715	110,833,311
*Total traffic receipts		Mex. $441,541	Mex. $1,820,273
Passengers per car-mile		5·95	22·73
Receipts per car-mile		Mex. cents, 22·31	Mex. cts., 37·33

The chief features of the policy which has produced the striking results revealed in the foregoing figures are (1) low fares to induce the poorly paid natives to travel—really *creating* a new traffic, and thereby securing a very high occupancy of the cars; (2) very frequent fare section points, necessitating short overlapping sections, to allow of passengers paying for the *exact* distance travelled—the Chinese, one and all, have very keen commercial instincts; and (3) the general introduction of trailer cars. Shanghai is quite flat, and particularly suited to trailer operation, no brakesmen being required.

In the month of July 1915, railless electric traction was introduced on about a mile of route in a narrow thoroughfare of dense traffic in the busy area, and this preliminary route has proved an unqualified success in every way. At the company's annual meeting in May 1920, the general manager, who was then in London, stated, "In railless electric traction, as we have developed it, on a mile of very busy route which we have had in successful operation for some years, there is a system which has proved its complete suitability for more general use in Shanghai for both passenger and freight services." Negotiations are now in train with the Municipal Council regarding an application by the company for powers to carry out considerable extensions of the railless system, and these proposals, which cover about twenty miles of route, include the handling of freight traffic in addition to passenger services. The company, which is now in a sound financial condition, paid dividends of 20 per cent. on its original capital of £320,000 in respect of the years 1919 and 1920, and early last year a distribution was made of fully paid bonus shares of £10 each in the ratio of one new share for every four shares held by shareholders, bringing the capital of the company up to £400,000.

China, with its teeming millions, offers vast possibilities for the introduction of electric traction—in view of Shanghai's experience probably railless electric traction would be the most suitable form—and it is almost unbelievable, for instance, that the capital city of the Republic possesses no modern system of public transit commensurate with its size and importance. Peking, to the professional eye, simply "pleads" for such a system, with its busy native life and its wide and straight main thoroughfares. This latter condition, unfortunately, is the reverse of what one usually finds in China, but the Chinese are realising more and more the necessity for wider streets in their cities. When I left China, over a year ago, Canton, in the south, was being reconstructed to permit of the introduction of a system of modern traction, and the reconstruction of Hankow, on the Yangtsze, was in hand when the war broke out in 1914. Another sign of the times was the tearing down, a few years ago, of the wall surrounding the Native City at Shanghai to make way for the construction of a wide thoroughfare.

From the statements of members of the American group in the Chinese banking consortium (made while visiting China during recent years), it is clear that applications for loans for constructive purposes required by the Provincial and Central Governments will be sympathetically received by the consortium. This is as it should be, and the success of the Washington Conference—at the moment most promising—would certainly hasten, as already mentioned the bringing about of an improved political situation in China, and the development of a healthy economic outlook. It should be borne in mind that China, with her vast industrious population and her practically untapped natural resources, is probably further from insolvency

* The present value of a Mexican Dollar is about 2s. 6d.

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to-day than any other nation in the world. The march of events in China may be more rapid than most of us imagine, and Japan's meteoric rise to a position of importance among the great nations is perhaps not without its lesson.

The electrical industry, like all other industries in Great Britain at the moment, is suffering from the loss of foreign markets, but I am enough of an optimist to believe that British ability and enterprise are still realities, and that they will not be found wanting when world conditions again become propitious. In this brief article I have merely tried to show that, in the coming great effort to increase our exports, it would be well for us to "Keep an eye on China."

LONDON & HOME COUNTIES ELECTRIC SUPPLY.

REPORT OF THE COMMISSIONERS.

The Electricity Commissioners have issued their decision (as was briefly stated in our issue of December 17) on the schemes submitted to them for the reorganisation of electricity supply in the proposed Home Counties district. In issuing a summary of the proposals, the Ministry of Transport mention that the decisions have been taken by the Commissioners after consideration of the evidence given at the inquiry held last June and July. The main points are as follow—

(1) The provisionally determined district is confirmed, subject to a few minor modifications.

(2) A Joint Electricity Authority is to be established for the district upon the lines proposed in the schemes promoted by the London County Council and the conference of local authorities owning electricity undertakings.

(3) The Commissioners concur generally in the engineering proposals submitted for dealing with the requirements of the district during the *first* stage terminating about 1925-1926. These involve some extensions of existing plant and the grouping of stations, so that the fullest use may be made of plant which will amount by 1925-1926 to 633,000 KW. in all.

(4) For developments beyond the first stage, the Commissioners have evolved a modified scheme which shows substantial savings over the schemes submitted. This involves the erection of a well-placed riverside station or stations where facilities for condensing water, coaling, etc., can be easily obtained. The first capital station is to be on the Barking site, which the County of London Electric Supply Company, Limited, have acquired, and on which they are prepared to begin immediately the construction of a 100,000 KW. station. The company can be called upon before August 1926 to sell this station to the Joint Authority on terms to be prescribed.

(5) The expected economies cannot be effected unless there is inter-communication of the principal generating stations in the area, combined with the pooling of the available plant. Excluding stations owned by power companies, only some 12 to 14 stations will ultimately survive as generating stations, and these should vest in the Joint Authority. The remainder, of which about 50 will be gradually closed down, can be incorporated in the scheme under an appropriate system of control. Negotiations as to terms of transfer of generating stations to a Joint Authority are in progress.

(6) The North Metropolitan Electric Power Supply Company and the Metropolitan Electric Supply Company are to have delegated to them the supply powers of the Joint Authority in their respective areas.

(7) The authorised undertakers should finance all extensions of generating plant at their stations while such stations remain in their possession, and any inter-connecting mains required before the Joint Authority is in a position to act. The Joint Authority should raise any necessary capital thereafter.

The Commissioners point out that the proposals of certain railway companies to proceed with the electrification of their suburban lines constitute an added reason for reorganising the supply and constructing a capital station at an early date. They do not hold the view that a Joint Authority would be unable to generate more cheaply than a railway company owning its own generating station, and consider that a combined supply from a common source would be advantageous to both parties.

An Appreciable Saving.

The Commissioners express gratification that a large measure of agreement has been arrived at between the promoters of the three principal schemes submitted. All the parties to these schemes agree that an improvement in the present position is urgently needed, and that a Joint Electricity Authority, representative of all interests, should be established without delay to carry out the necessary reorganisation. The duties which will devolve upon the Joint Authority under the scheme which the Commissioners will approve will be such as can be efficiently administered over a wide area. These duties will broadly involve the acquisition or control of generating stations for the purpose of pooling the generating plant and for the more economical operation of the stations in the whole district, leaving local distribution to authorised distributors. In the Commissioners' opinion the Joint Authority should consist of 26 representatives (or 27 if the chairman is elected from outside), allocated as follows—Local authorities, 8; companies, 8; London County Council, 6; other County Councils, 3; railway companies, 1.

Alternative schemes were submitted for meeting anticipated developments in the period beginning in 1925-1926, involving capital expenditure in the one case of £9,750,000 and in the other of £23,855,000. The scheme adopted by the Commissioners will need practically no more new capital expenditure than the continued extension of the group stations. Further, as compared with the estimated annual cost of electricity supplied to authorised distributors, namely, £7,262,700, or 1·147d. per unit, under one of the schemes submitted, the Commissioners' proposals should enable electricity to be delivered at a cost of £6,190,700, or 0·978d. per unit, an annual saving of upwards of £1,000,000, or 15 per cent., with all the advantages derivable from a capital station, such as availability for large railway or other supplies in bulk at favourable rates.

With regard to the acquisition or control of generating stations, the Commissioners note that there is a large measure of agreement among those concerned, and they are of opinion that it should be possible to settle terms of transfer on a basis equitable to local authorities and companies alike, which would be neither unduly burdensome to the Joint Authority nor adverse to the interests of the consumers of electricity.

The Commissioners will embody their decisions in a draft order, which will be the subject of a further inquiry, as provided by the Act of 1919.

London County Council's Opinion.

In view of the decision of the Electricity Commissioners that the first capital station should be erected at Barking by the County of London Electric Supply Company, the London County Council have urged on the Commissioners the need for safeguarding the public interests in any conditions they may attach to their consent. In a letter addressed to the Commissioners on December 16, the clerk of the Council pointed out that the matter had become of special importance by reason of the fact that under the County of London Company's Act of 1921 certain provisions were laid down to govern the terms upon which the Barking supply might be purchased by a Joint Electricity Authority or other body. Further, under the Act the terms of purchase were to be laid down as part of the conditions of consent by the Commissioners to the work proceeding.

> "In these circumstances" (the letter continues), "the Council wishes again to urge very strongly upon the Commissioners the importance of safeguarding any consent which may be given with such conditions as will adequately protect the interests of the public and preserve the position of the Joint Authority or other purchasing body. With regard to the suggestion made in the Council's letter of August 13, 1920, that any consent which might be given should be limited to such works as were necessary for the company's own requirenemts, I am to press upon the Commissioners that no action should be taken at this stage which will have the effect of tying the hands of the Joint Authority as regards the future electricity development of the London area. As regards the question of the authority to be designated as the purchasing authority, I am to suggest that the Commissioners in giving their consent should have regard to the possibility of no Joint Authority having been set up under the provisions of the Act of 1919 by the date at which the purchase powers will expire, and that provision should, if possible, be made in the consent for some other defined authority to have alternative rights of purchase."

Need for Railway Electrification.—Sir Philip Dawson, M.P., speaking in London on December 20, said the total cost of the electrification of various railways would involve an outlay of at least one hundred millions sterling, and of the total about 75 per cent. would be paid in wages. If the three most urgently needed electrification schemes around London were begun, as was quite possible, within the next few months, there would be between thirty and forty millions of money spent in a period of from four to five years, and those schemes would employ from 40,000 to 50,000 men, mostly of the skilled type. He did not favour general standardisation in the carrying out of electrification.

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COST OF EDINBURGH ELECTRIFICATION.

CITY TREASURER'S FAVOURABLE REPORT.

The financial aspect of the proposed electrification of the cable tramways of Edinburgh Corporation is dealt with in a report prepared by the City Chamberlain (Mr. R. Paton), at the request of the Tramways Committee. After quoting figures relating to the total capital expenditure on the existing tramways, he says that since 1896 or thereabouts the tramways undertaking has redeemed over £1,000,000 of debt, and this is comparable with the additional liability of about £750,000 which an entire conversion to overhead electric tramways would render necessary.

The report proceeds to suggest a system by which the outstanding debt on the cable system (£372,000) should be dealt with in view of the electrification. Mr. Paton proposes that this debt should be divided between the old cable system, converted electric system, and motor omnibus system, and that the division should be roughly on the following basis—£150,000 to old cable system, £200,000 to converted electric system, and £22,000 to omnibus system.

The City Chamberlain goes on to say that the estimate by the tramway manager (Mr. R. S. Pilcher) of the cost of electrification is £648,711. He takes the present statutory period of 30 years for redeeming this expenditure, and on the *annuity* system (which means a uniform burden for sinking fund and interest during the whole period, whereas the *instalment* system means a heavier burden in the first years of the period, but a lighter burden thereafter) finds that it means an additional annual burden of £44,635. Against this, however, he points out that there will be a saving in the working expenses of the electric system, as compared with the cable system, of about £98,000 per annum. The net saving he accordingly puts at £53,365, which, he says, will be available to meet renewals and provide reductions in fares. Some consideration must be given to the number of years over which the debt for capital expenditure should be redeemed. The maximum statutory period at present authorised is 30 years. This is in operation for the £200,000 proposed to be allocated to electric. As regards the £97,000 incurred, or to be incurred, since the Corporation assumed the management of the undertaking, and also the £648,000 estimated by the tramway manager, the period for redemption of this expenditure should, in his opinion, be 25 years. With regard to the method to be adopted for repayment of the debt, Mr. Paton has no hesitation in recommending that the instalment system be adopted.

"A CONSIDERABLE SAVING."

The City Chamberlain alludes to the fact that the debt charge on the electric as compared with the cable system would show an increase of fully £30,000, and points out that there is an important set-off to the increase in debt charge. As pointed out in the tramway manager's report, the cost of working "cable" is now much greater than that of "electric." There would accordingly be a very considerable saving in working expenses if the conversion to electric is carried out. He puts this saving on the basis of last year's experience (Edinburgh cable and Leith electric) at 4·2d. per car-mile, or £98,000 per annum. If the debt charge be excluded in each case, as he thinks it should be, for a comparison of this kind, the difference in the working costs of the two systems was last year as much as 5½d. per car-mile, equivalent to £128,000 per annum. Last year, however, was somewhat exceptional. In a normal year the saving may be put at probably not less than from £50,000 to £60,000. This would, of course, be far more than the sum required as a set-off to the additional debt charge. It would accordingly appear that if it is decided to proceed at once with the electrification of the whole cable system, the financial result, so far as that is affected by additional debt charges based on the figures submitted, will be quite satisfactory.

REPORT ON BURTON TRAMWAY ACCIDENT.

Burton-on-Trent Tramways Committee have issued the report of Major Mount, the Ministry of Transport's inspector, on the overturning of a tramcar in Station Street on November 3 (as reported in our issue of November 5). A number of passengers were injured, though not seriously. The report stated that when at the facing points leading from the single to the double line the leading wheels took the left-hand track and the trailing wheels followed the right-hand track. All the wheels finally left the rails on which they were travelling, and the car then skidded and overturned. The body and truck were not seriously damaged, but the trailing axle was broken. The motorman estimated his speed at nearer four than five miles an hour, but the inspector formed the opinion that it was probably six miles an hour. It was impossible to say definitely when the axle broke, but he agreed with the Corporation officials that the fracture took place at or just before the car reached the points. Having referred to the bad record of axle fractures, to which the Corporation was fully alive, and the constant shocks received (as pointed out by the Corporation's electrical engineer, Mr. T. Hall) during the passage of cars over the street railway crossings, the inspector said it was clear that either the efficiency of manipulation in regard to the speed in which cars are being driven in Burton had depreciated since the war, or else axle material was not as good as it used to be. It was evident there was a tendency to exceed the permissible speed limit. It was important that restrictions through junctions, round curves, and over level crossings should be strictly observed by the inspection staff, not only in the interests of safety, but having regard to the maintenance of rolling stock. His opinion was that even though derailed, the car would not have overturned had the speed through the junction not exceeded four miles an hour. As to the quality of the axle steel, the inspector thought that having regard to the pre-war record of failures, it must be admitted that the material was not so good as it used to be, and the Corporation would be well advised to pay particular attention to this important question from the safety point of view. It would be advisable to insist upon, and, if necessary, in the case of small orders, to pay for the usual tests before purchase, and in this connection the inspector drew attention to the British Engineering Standard Association's recent specification for tramway axles (August 1921).

The Tramways Committee have informed the Minister of Transport that the question of broken axles was receiving careful consideration, and that steps were being taken to ensure that motormen did not exceed the maximum speeds authorised.

RAILWAY ARCHITECTURE.

INTERESTING EXHIBITION AT EUSTON STATION.

An exhibition was recently held at Euston Station, London, of drawings and designs executed by the architectural staff (chief engineer's department) of the London and North Western Railway. Its object was to promote interest in architecture and art generally, especially among those responsible for the design of railway premises such as stations and offices. The work on view was selected from that done privately by the staff in pursuance of their studies, and many of the drawings had gained awards in various competitions, including those of the Royal Academy.

Mr. E. C. Trench (chief engineer to the company), in declaring the exhibition open, said it was not intended as an advertisement for the architectural staff, but was an effort by them to encourage their colleagues and friends to take a little more interest in architecture than they were doing already. Nothing added more to the interest of travelling than some knowledge of the buildings—such as churches and old houses—which were seen as one went about. To take an interest in architecture tremendously enhanced the pleasure of travelling. Mr. Trench went on to refer to the manifold activities of such a man as Sir Christopher Wren, and pointed to some of the outstanding works of his life (including St. Paul's Cathedral, with its 10,000-ton dome) as instances of the attractive field of study that lay before the architectural student. Proceeding, he mentioned humorously that at Euston they all lived in watertight compartments, and no one knew what his next-door neighbour was doing. They had, however, some "live architects" up there, and the work now on view was not done for the company, but in the staff's own spare time, with a view to qualifying not as mere architectural draughtsmen, but for the status of properly skilled architects. On the whole they had presented a very pleasurable show. (Applause.)

Lieut.-Colonel Cortez Leigh (chief electrical engineer to the company) proposed a vote of thanks to Mr. Trench, and this was heartily endorsed. In the course of his remarks he complimented Mr. R. Wynn Owen (architect) upon the London and North Western Railway War Memorial, which has been erected to his design in Euston Square, and said it was generally agreed that this monument was one of the best of its nature raised to the memory of those who fell in the war.

The drawings on view revealed a high level of merit. In the case of original creative work for buildings on a large scale, one was impressed by the spacious conception and dignity of some of the designs. The exhibitors were as follow—Messrs. R. Wynn Owen, A.R.I.B.A. (chief architect); W. H. Hamlyn, A.R.I.B.A.; H. J. Davies, M.S.A.; H. Holland, A.R.I.B.A.; W. H. Jackson, W. J. Waterman, and S. Honour, M.S.A. The last set of drawings prepared by the late Captain James Norquoy, who fell in action in 1917, were on view, and there was also a model of the L. and N.W. War Memorial, prepared by the sculptors.

Price of Steel Bars Reduced.—The South Wales Siemens Steel Association have decided again to reduce the price of steel bars by 7s. 6d. a ton, making the price £7 7s. 6d. a ton. During the war steel bars fetched £30.

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SIR JOHN TIMPSON, K.B.E.

The inclusion of Councillor John Timpson, deputy mayor of Portsmouth and chairman of the Portsmouth Corporation Tramways Committee, in the list of New Year Honours, is specially gratifying to his friends in the tramway industry. Councillor Timpson was three times Mayor, and filled other civic offices with much credit. He represented the Corporation during the important years following the war, one of his duties being to announce from the Town Hall the signing of the Armistice. He received many distinguished visitors, and among his guests at Portsmouth from time to time have been the officers and men of the Brazilian squadron and the Japanese squadron. He received the Crown Prince of Japan, and the Prince of Wales on his return from Canada and America in

Sir John Timpson, K.B.E.
(Chairman of Portsmouth Corporation Tramways).

December 1919, and again in October 1920, on the Prince's return from Australia. During the war he raised £850,000 for the last Victory Loan, and concluded three years of energetic work by seeing the war memorial through to its completion. For this scheme, including £10,000 set apart for the hospital, he raised over £30,000.

As chairman of the Portsmouth Corporation Tramways, he has for many years taken a prominent part in the industry, and in 1920 he was appointed a member of the Council of the Municipal Tramways Association, and at the Salford conference last September he was elected vice-president. Some time ago Councillor Timpson received the Japanese Order of the Knight of the Sacred Treasure.

MIDDLESEX TRAMWAYS AND ROADS.

In his annual report, the Middlesex county surveyor says there are many unsatisfactory lengths of road in the county, due to difficulties in obtaining suitable materials even for ordinary maintenance, while improved surfacing to meet the changed conditions of traffic has only been possible on a very restricted scale. One of the main difficulties in the way of improvement is the bad condition of many of the tramway tracks. Until these can be reconstructed—which for financial reasons is likely to be a slow process—the haunches cannot be dealt with in a satisfactory way. The increase in traffic has rendered waterbound macadam uneconomical and most difficult to maintain. Unfortunately Middlesex has several miles of waterbound macadam haunches to tracks, which are hard to maintain if surfaced differently to the track, as heavy traffic causes trouble at the dividing lines of the varying surfaces. A counsel of perfection would be to pave the whole of the tramway haunches with wood on reinforced concrete when the tracks are reconstructed. In the meantime it would be advisable to substitute slag tar macadam or some bituminous material for the waterbound haunches.

FINANCIAL REPORTS AND MEETINGS.

PINCHIN, JOHNSON AND COMPANY, LIMITED, have declared an interim dividend of 5 per cent., less tax.

EAST KENT ROAD CAR COMPANY have announced a dividend at the rate of 10 per cent. per annum for the year ended September 30, 1921.

OMNIBUS LOSSES AT LINCOLN.—A loss of £1,900 has been incurred on the Lincoln omnibus services for the half-year ended September 30.

A.E.G.'S DIVIDEND.—At the general meeting of the A.E.G., held in Berlin on December 20, a dividend of 16 per cent., as against 14 per cent. last year, was declared on the ordinary shares.

LOSS ON DARLINGTON TRAMWAYS.—There was a net loss on the Corporation tramways for the year of £3,166, compared with £3,744 last year, in spite of the fact that the revenue had increased.

S. SMITH AND SONS (MOTOR ACCESSORIES), LIMITED.—The accounts for the past year show a loss of £295,437, and the surplus brought forward was converted into an adverse balance of £203,985.

SHANGHAI ELECTRIC CONSTRUCTION COMPANY.—A second interim dividend at the rate of 6 per cent. actual (12s. per share), less tax, in respect of the year 1921 has been declared, payable against presentation of coupon No. 18 on and after February 1, 1922.

YORKSHIRE (WEST RIDING) ELECTRIC TRAMWAYS COMPANY.—The directors have decided to pay a final dividend of 3 per cent., less income-tax, being at the rate of 6 per cent. per annum, on the 6 per cent. cumulative preference shares for the half-year ending December 31, 1921.

COVENTRY CHAIN COMPANY.—The profits of this company for the year ended August 31, 1921, were £35,546, and £8,222 was brought forward. The directors recommended a final dividend of 7 per cent. on the ordinary shares, making 10 per cent. for the year, less tax, placing to reserve £8,344, and carrying forward £9,386.

MORECAMBE TRAMWAYS COMPANY.—The year's working showed a profit of £1,255, or an increase of £448 on the previous year. The cars travelled 53,070 miles, or 1,967 more than last year. The number of passengers carried was 577,616, a decrease of 3,550. A dividend of 3 per cent. (half per cent. more than that for the preceding year) is being paid.

WARRINGTON CORPORATION TRAMWAYS.—The accounts for the half-year ended September 30 show a net loss of £200, as against £248 for the corresponding period in 1920 on the tramways, and a net loss of £209, as against £569, on the omnibuses. The assessment of the undertaking has increased from £1,429 in 1914 to £6,724 in 1921. The increase in rates alone was £5,295.

NATIONAL OMNIBUS AND TRANSPORT COMPANY.—The directors have recommended that no dividend be paid for the year ended October last. The profits show an increase of nearly £7,000, the amount being £26,900, as against £20,100 for the year preceding, when a dividend of 8 per cent., less tax, was paid. Including a sum of £7,700 brought forward, there is a total available of £34,600, of which £15,000 is to be transferred to depreciation of rolling stock, leaving £19,000 to be carried forward.

FERRANTI, LIMITED.—The net profit for the year ended June 30 last was £36,268, and including £89,462 brought in, the amount available is £125,730. The sum of £100,000 has been transferred to general reserve, and there is a balance of £25,730. Out of general reserve, amounting to £172,000, it has been decided to write down the value of goodwill and patent rights, leaving the reserve at £102,630. The directors recommended a dividend of 18 per cent., less tax, being three years' arrears on preference shares. It is stated that there was a serious falling off in orders during the beginning of 1921, which will materially affect the next financial year.

CORDOBA LIGHT, POWER AND TRACTION COMPANY.—Sir George A. Touche, Bart. (chairman of the company), presided at the annual meeting in London on December 20. In reviewing the present position and prospects of the company, he said they ought to electrify the horse tramways which they took over more than a year ago, as well as make certain extensions of the electric lines. In regard to the tramways company, the figures showed a decided improvement during the year. The increase in gross receipts in 1921 over 1920 was £25,603, or over 32⅓ per cent. The expenses increased by £12,310, or 23½ per cent., a not unreasonable increase when the larger traffics and the high price of materials and labour for maintenance were considered. No cash was available for the payment of dividends earned on the preference shares, and this had made it necessary to deal with them under a scheme of arrangement.

CARDIFF CORPORATION TRAMWAYS.—At a meeting of Cardiff City Electric Light and Tramways Committee on December 16 (Councillor Sydney Jenkins presiding), Mr. Allcock, the City Treasurer,

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reported that the traffic receipts of the tramways for the past year amounted to £290,890, as against £278,383 for the previous year, an increase of £12,507. The parcels service had earned £907, as against £838 for the previous year, an increase of £69. Advertising on the cars brought in £2,240, which was an increase, compared with 1919-20, of £628. The excess of expenditure over income for the year ended March 31, 1921, was £8,533. The depreciation fund at the date already given was £108,988, whilst the loan liability of the undertaking at the same date was £878,321, the net liability being £415,490. With regard to omnibuses, six had been purchased at a total cost of £12,812, excluding the cost of tyres, and the service was started in December, 1920. Up to March 31, 1921, there was a deficit on their running of £1,096. Mr. R. L. Horsfield (tramways manager) reported that the deficit on the tramways in a great measure was attributable to the increase of wages. Operating costs for the year came out at 19·76d., which in comparison with 23 similar undertakings in the country was very good. The average working costs were 20·296d. per car-mile.

Belfast Corporation Tramways.—The accounts for the six months ended September 30 last showed that the receipts amounted to £334,138, and the expenditure, including capital charges and depreciation (together with the proportion of the deficit from last year, £19,818) amounted to £356,569, involving a loss of £22,431. The expenditure shows an increase of more than £20,000 as compared with the same period of 1920. Councillor Turner (chairman of the Tramways Committee), in moving the adoption of the minutes in the City Council, pointed out that the actual net deficiency for the half year, after allowing for the portion of last year's deficit, was £2,613. Had it not been for the abnormal increase in the cost of power, viz., £13,266, the higher standing charges could easily have been met, and a useful surplus obtained which would have enabled the committee to reduce last year's deficit by a reasonable amount. Although the position of the undertaking financially was not all they could desire, yet having regard to all that it had had to contend with, such as curfew restrictions, unemployment, and unrest in the city, he felt sure the Council would agree that the net result of the six months' working might have been very much worse. As it was they were in a better financial position to the extent of £10,901 than for the corresponding period in 1920, the deficiency for that term being £13,514.

Cape Electric Tramways, Limited.—The annual meeting of this company took place at 1 London Wall Buildings, London Wall, E.C., on December 14. The accounts for the year ending June 30 show a profit of £81,724, and after providing interest on, and redemption of, debentures, and bringing in the balance from last year, there is a disposable balance of £60,046. The reserve fund has been increased by the sum of £18,000, leaving a balance of £42,046, out of which the directors recommended the payment of a dividend of 6 per cent. on the ordinary shares, absorbing £29,473, leaving a sum of £12,573 to be carried forward. The total number of passengers carried during the year was 29,773,587, an increase of 3,851,958. The traffic receipts amounted to £397,124, as against £325,085, or an increase of £72,039. The capital expenditure during the year was £70,620, including the cost of the new rolling stock at Cape Town and the new engine and generator and small extensions of track at Port Elizabeth. After long negotiations the Cape Town municipality had decided not to proceed with their proposal for the acquisition of the Cape Town system, and the concession will now run until 1925, when the Council have again the right to purchase. The Board expressed their appreciation of the services of Mr. W. F. Long, general manager at Cape Town, and Mr. W. H. Fremantle, general manager at Port Elizabeth, and respective staffs.

Brown Bayley's Steel Works.—Including the balance brought forward from the previous year, and after deducting the interim dividends paid on the ordinary shares and the preference shares to June 30, there was a balance of £29,456, which had been appropriated as follows—Preference dividend for two months ended August 31, £4,166, final dividend of 2½ per cent. on the ordinary shares, £5,250, carrying forward a balance of £20,040. To enable the company to take advantage of the provisions of the last Finance Act as to stock valuation for the purpose of excess profits duty to date, the stocktaking was altered from July 31 to August 31, but it is the intention of the Board to adopt July 31 as the date in future. At a meeting of the company Mr. Robert Armitage, M.P., chairman and managing director, said that the next accounts would cover a period of only seven months. As a result of the decision of the Government in regard to excess profits duty, they hoped to improve their financial position by making application for the return of money paid instead of paying more. Like other concerns, they were suffering from the general trade depression, and as regards the future it was very difficult to hold a fair balance between optimism and pessimism. He did not think trade was going elsewhere; it was non-existent. People would not buy on falling markets, which had not reached the end as yet. An improved feeling would make people more inclined to launch out into industrial schemes. Mr. W. R. Mainprice, in proposing approval of the interim dividends, said that they had just passed through twenty months of difficulty as great as any the company had experienced. There were, however, bright spots. They had now produced a stainless iron, and were certain that they could deliver the goods.

CONTRACTS AND ORDERS.

Leeds Corporation Tramways have received a No. 5 "Celerity" rail grinder from the Equipment and Engineering Company.

Brown, Bayley's Steel Works, Limited, are to have an order for 100 driving wheel tyres and 25 pony tyres from Blackpool Tramways Committee.

Bolton Tramways Committee have accepted the tender of the English Electric Company, Limited, for tramcar equipment and spare parts.

Salford Tramways Committee have recommended the acceptance of the tender of Hadfield's, Limited, for Hadfield's patent steel switches, open mates, and crossings.

The Swedish East Coast Railways are stated to have ordered from the Rhenish Steel Works Company steel rails sufficient to cover their demands for the whole of 1922.

Bloemfontein Town Council are to spend £18,000 on the purchase of five new railless cars and other purposes connected with the railless system. This is in addition to the three other cars now on order.

Edinburgh Corporation Tramways have placed an order with the Equipment and Engineering Company, of 2 Norfolk Street, London, W.C., for an improved "Simplex" rail jack and carrier, for transporting 60 ft. rails.

Electric Welding Plant for Aberdeen.—The Corporation Tramways Committee of Aberdeen have sought tenders for an electric welding plant at about £600. They also propose to erect two additional shelters at a cost of £182 each.

The Titan Trackwork Company, Limited, of Rutland Works, Sheffield, have received contracts for the supply of Titan manganese steel points, crossings, and special work for Leeds City Tramways and for Plymouth Corporation Tramways.

The London County Council have accepted the tender of the Anderston Foundry Company, Limited, for 1,000 yokes required in connection with the conversion from the side slot to the centre slot system of the tramways in Kingsland Road.

Bradford Tramways Committee have recommended acceptance of the following tenders—The British Insulated and Helsby Cables, Limited, for copper rail bonds—500 at 3s. 2d. each, and 1,000 at 2s. 9d. each, and Crossley and Davenport for one ton of mild steel cotters at £36.

The Acme Flooring and Paving Company, Limited, are the successful tenderers to the London County Council for the supply of 140,000 creosoted deal paving blocks required in connection with the reconstruction of the tramway tracks in Paddenswick Road, Hammersmith. The price delivered at the wharf was £18 10s. per thousand. Eleven tenders were received.

The Victorian Electricity Commissioners, at Melbourne, Australia, have accepted the tender of Messrs. J. Thompson, Wolverhampton, for the complete steam-raising plant at the Morwell power-house at a cost of £282,000, of which £137,000 is to be expended locally. For the supply of steel work the tender of Redpath, Brown and Company (£115,000) has been accepted.

Aberdeen Tramways Committee have authorised the purchase of a welding plant from either the Metropolitan-Vickers Electrical Company or the Equipment and Engineering Company. The price will be between £300 and £350. They also authorised the purchase of a re-conditioned chassis from Messrs. J. I. Thornycroft and Company, to be used as a lorry, and also in connection with welding.

Sandberg "In Situ" Rail Hardening Process.—The Scholey Construction Company, Limited, 56 Victoria Street, London, S.W.1, have secured contracts for the "in situ" treatment of track for the Hastings Tramways Company and the Cardiff Corporation Tramways. The Scholey Company are now executing contracts on tramways at Leeds, Wallasey, Liverpool, Hastings, and Cardiff.

Aberdeen Corporation Tramways Committee have recommended acceptance of the following tenders for permanent way renewal—Rails—A. M'Bean and Sons, Wolverhampton (£12 17s. 6d. per ton); fish-plates—A. M'Bean and Sons (Wolverhampton (£15 17s. 6d. per ton); fish-plate bolts and nuts—Norton and Son, Darlaston (£24 per ton); tie-bars—W. Bain and Company, Coatbridge (£19 per ton); anchor bolts—J. and C. Murray, Glasgow (£32 per ton); chilled blocks—Barry, Henry and Company, Aberdeen (£12 3s. 9d. per ton).

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TRAMWAY AND LIGHT RAILWAY NOTES.

ABERDEEN.

TRAMWAY DEVELOPMENT SCHEME.

The Corporation, in a Draft Provisional Order, seek powers to construct additional tramways, a new street or road, and to borrow further money for street works and the extension of the Esplanade, and for the tramway and gas undertakings. It is pointed out that the Corporation, having acquired the lands known as the Hazelhead estate, adjacent to the city, find it expedient to extend the tramway service from Rubislaw terminus to the Hazelhead estate. The new undertakings are estimated to cost £620,000, of which £174,500 will be expended on the construction of the tramways and tram road, the acquisition of lands, and electrical equipment; £170,000 for the erection of buildings and plant for gas works purposes; £30,000 in connection with the provision and running of omnibuses; £50,000 for the construction of buildings in connection with the tramway undertaking; £50,000 for repairing and recausewaying existing streets and laying out new streets within the city; and £39,000 for the extension of the Esplanade.

BIRKENHEAD.

IMPROVEMENTS DEFERRED.

The Tramways Committee have decided not to proceed with the work on certain tramway routes which was intended to provide work for the unemployed. The estimated expenditure was £99,800, and this sum has been found too large to permit of a remunerative investment, as repayment was required in eight years.

BRADFORD.

TRACK RENEWAL—EXTENSION DEFERRED.

The Tramways Committee propose to apply for sanction to borrow £450,000 for track renewal. The committee have found it necessary, on financial grounds, to defer an extension of their system from Bailiff Bridge to Brighouse, as desired by the Brighouse local authority. Halifax Corporation tramcars have hitherto served Brighouse, but the former's lease has expired.

BRIGHTON.

REVERSION TO PENNY FARES.

The Town Council resolved that in view of the continued decreasing income from tramway fares, it was advisable that penny fares stages be tried for three months from January 1 last. The former minimum was 2d.

CHESTER.

OPERATION OF TRAMWAYS TO BE CONTINUED—OMNIBUS SERVICES PROPOSED.

Mr. A. R. Fearnley (general manager of Sheffield Corporation Tramways) has reported on his examination of the Chester Corporation system, with a view to advising on the relative merits of (1) putting the track in order and continuing to work the tramways on similar lines to the present; (2) taking up the track from the Castle to Saltney and providing in lieu a service of omnibuses or railless cars; (3) obtaining tenders for leasing or purchasing of tramway system; (4) inviting tenders for omnibus services. Mr. Fearnley recommends that the tramways be maintained as at present laid out. The work which requires to be put in hand in order to allow the undertaking to be continued would not be expensive, and could easily be met out of the existing renewals, which in March last amounted to £17,539. Discussing the question of omnibus services, Mr. Fearnley states that the municipality should carefully consider the question of extending the present tramway services by instituting omnibus services in connection with the tramcars. The Tramways Committee have decided to recommend the Corporation to maintain the tramways as at present laid out, and to proceed at once to deal with this question on the lines which are likely to cause the city the least financial loss, and at the same time enable them to retain in their own hands the control and operation of the system.

DOVER.

PROPOSED RAILLESS TROLLEY SCHEME.

The Corporation Tramways Committee, after hearing a report by the general manager (Mr. E. H. Bond), decided to apply for a provisional order to authorise the introduction of railless trolley cars in the town.

GLASGOW.

WAGE REDUCTIONS—AIRDRIE TRAMWAYS PURCHASED—THE PAISLEY PROBLEM—NEW BRIDGE.

The Corporation tramway employees accepted the recommendation of the Corporation Wages Committee of a further reduction of 3s. per week, to be made from the first full pay in December in the case of motormen, conductors, shed employees, and permanent way men, and 1s. 6d. per week in the case of female employees and boys under 18 years of age and non-able-bodied employees, on condition that the difference of 1s. as compared with the national agreement be d ducted from any further reduction at the end of January. The Council on December 9 accepted the recommendation of the Tramways Committee that the Corporation should exercise from December 19 the powers of the Airdrie and Coatbridge Tramways Trustees, by working the tramways in the two burghs, and that on the completion of the city extension from Baillieston to Coatbridge they should take over and work the system of the burghs as part of the Glasgow tramway undertaking. The purchase price is £82,250. The Tramways Committee recommended the City Council to purchase the undertaking of the Paisley District Tramways Company at a price of £200,000. A special sub-committee had previously recommended a price of £250,000. At a meeting of the Council it was intimated that the former sum was an impossible one from the company's point of view, and Baillie M'Whirr, the convener, asked the Corporation to remit the whole matter to the Tramways Committee for further consideration, and after some discussion this was done. The Town Council have resolved to proceed with the erection of a new bridge over the Clyde in line with Oswald Street. The Tramways Committee have agreed to pay half the cost.

HALIFAX.

PENNY FARES RESTORED.

A return to the penny minimum fare has been made on the Corporation tramways.

HULL.

TRAMWAY EMPLOYEES' NEW CLUB.

A club for the use of the Corporation tramway employees' Social and Recreation Society's Club has been opened in a room over the Osborne Street power-station. Mr. E. S. Rayner, the tramways manager, is president.

LEEDS.

MORE STANDING PASSENGERS.

At the City Council on January 4 a resolution was carried that 12 persons—instead of 8 as at present—in excess of the seating capacity be allowed to stand inside the tramcars. Alderman R. A. Smithson (chairman of the Tramways Committee) said the object was to regularise a practice that was already fairly general. Some conductors now filled their cars at rush times, while others adhered to the regulations, and allowed only eight excess passengers. The resolution would remove misunderstanding. He repudiated the suggestion that any of the Leeds cars were unsafe. From the accident point of view Leeds tramcars had the lowest possible average of costs in respect of accidents.

LIVERPOOL.

TRAMWAY EXTENSIONS DEFERRED—"SHOPPING" TICKETS.

The meeting of the City Council called for December 21 to consider an important scheme of tramway extensions was abandoned owing to the absence of a quorum. It is understood that the effect will be to defer the plans for at least a year. The overhead electric railway is issuing "shopping" tickets between the Dingle and the Pierhead and intermediate stations. The fares represent a reduction of 14 per cent. on first-class and 27 per cent. on third-class tickets

LONDON.

PROPOSED 1½D. FARES—AWARDS TO EMPLOYEES—INSPECTORS' PAY—ROUTE MAP—THROUGH RUNNING TO WIMBLEDON?—SPEED LIMITS—WAR MEMORIAL.

At the meeting of the London County Council on December 20 the Highways Committee reported that they had considered the resolution passed by the Council, on the motion of Mr. J. D. Gilbert, to consider and report as to the institution of a 1½d. fare for approximately 1·8 miles. The general manager reported, however, that the risk of loss of revenue if 1½d. fares were introduced would amount to a large figure, and that the issue of a 1½d. ticket would necessitate the issue of 2½d., 3½d., and 4½d. tickets, involving additional expense in printing, etc., and reduced efficiency in fare collection. Having regard to the probable heavy loss of revenue the committee had decided to postpone until after the end of the present financial year the consideration of any further fare reductions. A proposal for the award of prizes to members of the operative staff of the tramways department who submit practical suggestions for devices, etc., likely to minimise the number and duration of delays in the service, and for other ideas likely to be of advantage, has been arranged by the Highways Committee. The scheme provides that devices submitted by the staff shall be considered by an examining committee consisting of the general manager and the heads of the five branches of the tramways department. It is suggested that the amount to be distributed as awards should be £200 a year, the payment in each case being determined by the merit of the suggestion or device. The Highways Committee recommended that inspectors at the central repair depot should be divided into two classes, and that their basic rates of pay be fixed as follows—(1) £3 12s. 6d. a week, rising by annual increments of 5s. and 2s. 6d. a week

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respectively to £4 a week; (2) £2 10s. a week, rising by annual increments of 5s. a week to £3 10s. a week. This was approved. A new edition of the map and guide of the County Council Tramways has been issued. The map measures 16 in. by 12½ in., and shows clearly all the routes and services with terminal points. On the reverse side of the sheet are printed time tables for all routes, and particulars are given of the all-night services. The Council have issued a poster setting out the facts in regard to the tramway service. In the middle of the day the number of tramcars in service is at present 990. During the busy hours this number is increased to 1,450, and trailer cars are also run, making a total of 1,560 in service. The Highways Committee of Wimbledon Borough Council has been considering a communication from the London United Tramways, Limited, stating that negotiations were taking place between the London County Council and the company with respect to a proposal to run the London County Council tramcar service from London to Wimbledon. It was proposed that the lines be connected at Tooting, so that the London County Council cars might continue through Merton to the foot of Wimbledon Hill. Kingston-on-Thames Town Council have decided to object to any increase in the present speed limits on the London United Tramways which serve the district. A memorial to men of the Metropolitan Electric Tramways who fell in the war has been unveiled at Stonebridge Park Depot by the general manager, Mr. C. J. Spencer.

MANCHESTER.

Wage Dispute Settled—Driver's Record.

The Industrial Court have decided in favour of the Corporation in the dispute between them and the maintenance workers in the tramways and gas departments. The Corporation reduced the wages of these employees early in September. On October 19 the men stopped work on the advice of their unions, but resumed at the reduced rates on November 3, after agreeing with the Corporation that the matter should be referred to arbitration. At the hearing which took place at 5 Old Palace Yard, London, S.W., on December 13, in a division of the Industrial Court presided over by Sir William Mackenzie, the Corporation was represented by Mr. P. M. Heath (deputy town clerk), Alderman J. Bowes (chairman of the Tramways Committee), Dr. A. W. Chapman (vice-chairman), Alderman W. Kay, Councillor Cundiff, and Mr. J. Wood (assistant manager of the tramways department). The Court found that the Corporation was justified in making the reduction of 2d. an hour in the case of skilled workers and 1½d. an hour in the case of semi-skilled and unskilled men. The men affected in the tramways department number 250 skilled workers and 260 semi-skilled and unskilled men. Francis Redfern, aged 80, a Corporation tramcar driver, has retired after 41 years' service. He spent 22 years on the horse-drawn cars of the old Manchester Carriage Company, and 19 years on the Corporation's electric cars. Redfern has never been reported late for duty. The Tramways Committee has raised his pension from 12s. 3d. a week to 19s. 9d.

MIDDLESBROUGH.

Sunday Morning Car Service.

The Corporation proposes to discontinue the Sunday morning service, and cars will not start until 2 p.m. It was proposed that the service should be suspended from 6.30 to 8 p.m.

NEWCASTLE-ON-TYNE.

Protest Against Working Hours.

At a mass meeting of the Corporation tramways employees a resolution was passed protesting against the decision of the Council to rescind a former resolution granting a 44-hour week. It will be remembered that owing to the existing conditions the Council have found it necessary to revert to a 48-hour week.

NOTTS AND DERBY.

New Tramway Extension.

The proposal of the Notts and Derby Tramways Company for a new track from Heanor to Ilkeston has received the general approval of Heanor Urban Council.

PLYMOUTH.

Track Renewal.

The Minister of Transport has sanctioned, under certain specified conditions, a loan of £36,096 for the renewal of parts on the tramway track at Plymouth. One of the special conditions is that the rate of wages for unskilled labour must for a probationary period of six months be appreciably lower than the full district rate prevailing in the area. The cost of the above scheme does not include the provision of a new track in Alma Road, and application will be made to the Ministry of Transport for consent to give notice of intention to apply for an order authorising this work, the doubling of the track in Coburg Street, and an addition to the line at the eastern corner of Devonport Park, and other improvements upon which the Corporation have decided.

SALFORD.

No More Trolley-boys.

The Tramways Committee have ceased to engage trolley-boys. Those now employed will remain, but as they are gradually promoted their places will not be filled.

SCARBOROUGH.

Tramway System Changes Hands.

The service owned by the Scarborough Tramways Company, which was to have ceased permanently on December 31 last, has continued running, an offer to purchase the undertaking having been accepted by the management. This offer, which was subject to confirmation by the shareholders, came from a combination of London and Yorkshire engineers, with whom is associated Mr. H. Seaton, of the Yellow Motor 'Bus and Coach Service. Mr. Seaton will act as managing director. It is understood that the intention of the new company is to exercise their right, under the statutory power possessed by the present company, to run an omnibus service in conjunction with the tramways to every part of the town. At the beginning of the New Year the Scarborough and District Motor Services (proprietors, Robinson's Motors, Limited) commenced running vehicles on the tramway and other routes, and also doubled their service to the South Cliff. Messrs. Seaton and Company are also running a service of omnibuses. The Scarborough tramways were opened in 1904. The single track length is 7¾ miles, and the route length four miles. In summer the maximum number of cars (22) has been in use, but only six vehicles were found necessary in the winter. Mr. H. V. Moinet (general manager and electrical engineer) has attributed the failure of the company to make a profit to the inadequate length of the system, and its consequent inability to tap a sufficiently large area. The decision to cease operation followed a conference held on December 14 at the Ministry of Transport, at which representatives of the Corporation and the company were present. The tramways company, it is understood, had desired to cease running during the winter (as such a service was found unprofitable), and only to operate the cars in the summer months. The Corporation declined to consent to this.

SOUTHPORT.

Suggested Omnibus System.

The Tramways Committee, on the instructions of the Council, are considering the advisability of using motor omnibuses as an adjunct to, or in whole, or in part, in substitution of the existing tramways.

TAUNTON.

Absence of Tramcars Regretted.

At a meeting of the Town Council several members raised questions with reference to the possibility of a restoration of the tramway service, declaring that the present omnibus service was inadequate and unsatisfactory. Purchase of the undertaking by the Council was suggested, but did not receive much support. The Mayor stated that no steps would be taken immediately for the removal of the lines. Before the tramcars could be run again another Provisional Order would have to be obtained, and that would take at least twelve months. It will be recalled that the service of the Taunton Electric Traction Company ceased on May 28 last owing to differences with the Town Council over the charge for power.

WALLASEY.

Penny Fares Recommended.

The Tramways Committee have recommended the Town Council to restore penny fares on the tramways in the hope of increasing short-journey traffic. Each of the routes would be split up into penny stages, but the present 1½d. fares would be retained. Other proposals are as follows—A discount of twopence in the shilling on prepaid books of tickets instead of the present system of books of 13 tickets at the price of 12. Workmen's tickets to be available up to 7.30 a.m. instead of 7 a.m. The age for children's tickets to be 14 instead of 12. The recommendations are made in view of the seriously decreased traffic since the stages were shortened and the fares increased, and in order to popularise the tramways.

WIGAN.

Tramcar Mails—The Aspull Route.

The Tramways Committee will receive for the carriage of mails and postmen the sum of £500 per annum. Last year the Post Office paid only £200. The Watch Committee pay £200 per annum for the conveyance of the police. The Tramways Committee recommended the substitution of a motor omnibus service in place of the tramway cars from Springs Bridge to the Aspull terminus.

YORK.

Tramway Passenger Platforms.

Two raised temporary platforms have been placed outside the railway station close to the car lines, for the convenience of persons waiting for the cars. The platforms, which are marked at night by a red lamp at either end, offer a refuge from other traffic.

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PERSONAL.

Mr. Walter Rutherford has joined the board of G. D. Peters and Company, Limited.

Mr. J. G. Smeaton, deputy general manager of the Shanghai tramways, has resigned owing to ill-health after 14 years' service in Shanghai.

Mr. G. H. Wheeler, secretary of the Standing Committee of Railway Managers, has been appointed traffic manager of the Somerset and Dorset Railway.

Mr. D. H. Davies, of Heywood, has now accepted the position of general assistant in Chesterfield Corporation's electricity, tramway, and motor omnibus departments.

Mr. C. B. Collett, deputy chief mechanical engineer of the Great Western Railway, succeeded Mr. G. J. Churchward, who retired at the end of 1921, as chief mechanical engineer.

Mr. James Lord has resigned his position as borough engineer of Halifax, which he has held for 21 years. He has opened offices as consultant and constructional engineer at 17 Crossley Street, Halifax.

At the termination of the post-war work of the Ministry of Transport, the following honours were conferred—On **Sir Robert Francis Dunnell** (secretary of the North Eastern Railway Company) a baronetcy; on **Mr. Henry Allen Steward** (Principal Light Railway Commissioner) a knighthood.

Alderman W. G. Wylie has resigned the chairmanship of South Shields Tramways Committee, in order to make way for some younger man, after having held the position since the inception of the municipal undertaking. **Councillor J. G. Winskell,** the vice-chairman, has succeeded him.

Mr. W. A. Toppin, on relinquishing the position of assistant manager of the electricity, tramway, and omnibus departments of Chesterfield, was presented by the employees with a roll top desk. Mr. Toppin's address is now Toppin and Knowles, Limited, 202 Manningham Lane, Bradford.

Mr. George Hughes, chief mechanical engineer of the Lancashire and Yorkshire Railway Company, on January 1 became chief mechanical and electrical engineer of the combined London and North Western and Lancashire and Yorkshire Railway Company. **Mr. Arthur Watson,** who is the general manager, has now seven assistants. The superintendent of motive power for the existing Lancashire and Yorkshire Railway is now **Mr. F. W. Attock.** The duties of **Mr. E. F. C. Trench,** the former chief engineer of the London and North Western Railway, are now extended to cover the combined undertakings. **Mr. R. C. Irwin,** secretary of the Lancashire and Yorkshire Railway Company, succeeded Mr. James Bishop, who retired at the end of 1921, as secretary of the London and North Western Railway Company.

The late **Mr. John H. Balfour Browne, K.C.,** a leading counsel at the Parliamentary bar for various Corporations, left gross estate of the value of £655,000, and net personalty of £652,636.

We record with regret the death of **Mr. Montague Brown Mountain,** who was formerly connected with Mountain and Gibson, Limited, and latterly with the Gibson Roller Shutter Company. Mr. Mountain was in his fifty-third year.

Mr. Ernest Holt, who for the past nine years had been general manager of Ashton-under-Lyne Corporation Tramways, died recently at the age of 38. He went to Ashton as chief tramways clerk from Halifax in 1905, and succeeded Mr. Dugdale as manager in 1912. Under Mr. Holt's management the borough tramways have been completely reorganised.

Mr. Jacob Atherton, of Hurst House, Huyton, Lancs., one of the founders of the British Insulated and Helsby Cable Company, died at Torquay in his 69th year. Mr. Atherton, who was a native of Liverpool, was associated with his elder brother, Mr. J. B. Atherton, in many important commercial development schemes. When his brother returned from the United States in 1890 with the patent rights in paper insulated cables, Mr. Jacob Atherton joined him in the formation of the British Insulated Cable Company, and in the erection in 1890 of the extensive works at Prescot, which now bear the name of the British Insulated and Helsby Cables, Limited, the business of the Helsby Cable Company having been taken over more recently. The two brothers also established a number of electric lighting companies, of which Mr. Jacob Atherton was a director. Later they turned their attention to tramways, and promoted the construction of the South Lancashire system, which ultimately linked up Liverpool by tramway with Manchester. They also obtained a Light Railway Order for a tramway between Aigburth and Garston, which paved the way for the extension of the Liverpool municipal tramway service. Mr. Jacob Atherton was associated with tramway construction schemes in Australia.

BUSINESS NOTICES.

THE BRITISH EMPIRE TRUST COMPANY notifies that from January 1 their address has been Stafford House, 14-20 King William Street, E.C.4.

HENLEY TYRES.—The Bristol branch of the Henley Tyre and Rubber Company, manufacturers of Henley's "Zig-Zag" tyres and "Why Not" golf balls, is now at 146 Redcliffe Street.

Mr. PERCY FROST SMITH has requested us to announce that he has relinquished his residence in Maidstone, and is now residing in London. He has opened offices at 64 Victoria Street, Westminster.

BALDWINS PURCHASE THE EAGLE TINPLATE WORKS.—It is officially announced that the purchase of the Eagle Tinplate Works, Neath, by Baldwins has been completed. The works are reputed to be the best in the country.

Mr. D. LANDALE FREW, of 45 Hope Street, Glasgow, has been appointed by Hollings and Guest, Limited, as their sole agent for Scotland. Mr. Frew will be glad to hear from anyone interested in hydraulic machinery.

HYDRO-ELECTRIC PLANT FOR NEW ZEALAND.—A Reuter's message reports that the New Zealand Government have accepted tenders from British firms for £100,000 worth of plant for a hydro-electric power-station to supply Wellington and district. Mr. Massey, the Prime Minister, states that further tenders are under consideration. American and Swedish firms competed.

RANSOMES, SIMS AND JEFFERIES, LIMITED, of Orwell Works, Ipswich, have been appointed sole manufacturers and licensees in the United Kingdom, the Colonies, and Dependencies, South America, the Dutch Indies, and China, for the Kestner water-tube boiler. This type of boiler has been a great success in France, where it is manufactured by Schneider and Company, and is in use in many large municipal power stations.

A.E.C. COMMERCIAL MOTOR VEHICLES.—The Associated Equipment Company are prepared to appoint service agents in the large towns in Lancashire, excepting Liverpool and a 20-mile radius. Applicants must occupy premises in every way suitable for giving the best possible service to owners of A.E.C. vehicles. The agencies are offered only to applicants who are members of the Motor Trade Association. Particulars of plant, premises, etc., should be forwarded to the Associated Equipment Company, Limited, Walthamstow, London, E.17.

BETTINGTON WATER TUBE BOILERS.—The Fraser and Chalmers Engineering Works, of Erith (the proprietors of which are the General Electric Company, of Magnet House, Kingsway, W.C.), have placed on the market a new and improved design of Bettington pulverised fuel fired boiler, which is also suitable for colloidal fuel, oil, or gas firing. In its original form this boiler was first developed in 1905, and although notable success attended its adoption, certain inherent faults called for a remedy. The result is the evolution of the present central combustion chamber boiler, which has entirely eliminated the difficulties mentioned. It may be noted that the Bettington boiler is claimed to be the only type especially designed to burn pulverised fuel efficiently, and its advantages would be evident in power-stations, iron and steel works, etc.

TRAMWAY SUPPLIES, LIMITED., of Grove Mills, Meanwood, Leeds, have asked us to state that in order to deal more efficiently with their rapidly growing business in the South for both home and export requirements, they have opened an office at 93 Cannon Street, London, E.C.4, and have appointed Mr. Reginald Cox, late of the English Electric and Siemens Supplies, Limited, as manager. Mr. Cox has had many years' experience in tramway equipment requirements, and is fully qualified to deal with technical points or suggestions, as well as with the business details of prices, etc. In addition to their well-known point controllers, overhead and car equipment lines, Mr. Cox will also handle the range of high-class oil switches manufactured by the Tramway Supplies Company, comprising low, high, and extra high tension gear for all purposes, together with suitable high and low tension cable boxes and sub-station switch gear, fuse panels, etc.

THE LINCOLN WELDING PROCESS.—The Scholey Construction Company, Limited, of 56 Victoria Street, S.W., have taken over the agency for the Lincoln or R.W.B. dynamo plant from the Electrical Apparatus Export Corporation, and have adopted this type of welding plant for contract work in building up dished joints, and especially for the purpose of welding fishplates to the rails, as they believe it to be the best type of joint welding. The Scholey Construction Company will supply the welding plant, or undertake track or depot welding by contract. They will also be pleased to supply samples or tests or to give a demonstration of the class of work which can be done by the machine. The Lincoln welding apparatus is now in use on a number of important tramway systems in this country, including Belfast, Birmingham, Glasgow, Dundee, etc., and very satisfactory reports have been made with reference to the efficiency and convenience of the system.

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PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given in italics.

APPLICATIONS FOR LETTERS PATENT.

The number of the patent is given in brackets.

Safety device for traffic control for motor vehicles (32,624)—W. Bottomley and J. C. Wignall.
Electric feeder connectors for contact rails on electric railways (33,098)—Callender's Cable and Construction Company, Limited, P. V. Hunter, and J. Mather.
Life-guard for motor vehicles (33,086)—W. C. Carter.
Variable speed gearing for motor vehicles (32,711)—E. R. Chandler.
Trucks for tramcars (33,027)—W. Forber.
Motor vehicles (32,573)—R. T. Gascodine and G. Spencer, Moulton and Company, Limited.
Mechanically-propelled vehicles (33,226)—R. F. Hall.
Brake mechanism of power-propelled vehicles (32,618)—F. W. Lanchester.
Transmission system for motor vehicles (32,763)—H. Mobbs.
Non-skid devices for motor vehicles (33,274)—W. J. Reynolds.
Steering and driving gear of motor vehicles (32,741)—H. G. Smith.
Tramway rail joints (33,047)—E. C. Strong.
Mechanically-propelled vehicles (32,871)—F. Theakston and F. Theakston, Limited.
Transport and trailer vehicles (33,923)—L. Dewing.
Omnibus seat (33,484)—G. H. W. Collis.
Lifting jacks (34,019)—C. J. Paffard.
Direction indicator for road vehicles (33,304)—R. Robinson.
Day and night direction indicator for road vehicles (33,589)—R. Robinson.
Brakes for motor vehicles (33,518)—A. E. Rooke.
Front wheel guards for motor vehicles (33,617)—C. H. Salmon.
Motor vehicles (33,604)—H. Shore.
Life-guard for motor vehicles (33,601)—C. Whittle.
Motor omnibuses, lorries, etc. (34,076)—G. A. Bishop and R. A. Chadwick.
Electric current collectors (34,166)—British Thomson-Houston Company, Limited, F. H. Clough, and H. W. H. Warren.
Lifting jacks (34,682)—H. Butcher.
Sand gear operator for electric vehicles and engines (34,583)—H. Clark.
Electric rail bonds (34,345)—P. Croom-Johnson.
Indicator for road vehicles (34,571)—W. P. Quane.
Driving gear for motor vehicles (34,148)—J. S. Withers (*Perfecto Gear Differential Company*).
Seats for tramcars, etc. (34,711)—M. Woods.
Electric trolley poles (34,868)—G. W. Ferguson.
Feed mechanism for strip-charts, etc., for tramcars (35,071)—E. H. H. Gordon and E. W. Lewis.
Sheet metal sleepers for tramways (34,794)—A. H. Hill, Hill and Roberts, and E. Roberts.
Braking systems of motor vehicles (34,840)—E. T. Jackson.
Control switches for electrically-propelled vehicles (34,959)—P. V Powell.
Lifting jacks (35,114)—N. F. Scarborough and L. F. Whitehouse.
Renewable tramway metals (35,030)—A. J. Tuck.

SPECIFICATIONS PUBLISHED

1920.

Life-guards for motor road vehicles (23,033—*171,150*)—W. J. Turner, J. W. Collen, and A. J. Rolfe.
Lifting jacks (25,540—*171,234*)—A. D. Powell.
Emergency brakes for road vehicles (33,707—*171,310*)—J. B. Gayler and A. W. Gilbert.
Brake lever connections for motor road vehicles (24,618—*171,505*)—O. D. Cars, Limited, and J. A. McKee.
Driving gear wheels of motor-driven tramcars, etc. (28,422—*171,583*)—J. Farley and T. R. Irving.
Car brake controlling means (29,413—*171,594*)—C. E. Rochambeau.
Operating mechanism for vehicle route indicators (32,942—*171,621*)—W. L. Lorkin, E. E. Daglish, and H. B. Swift.
Extra air device for internal combustion engined motor vehicles (26,832—*172,160*)—J. V. Wilmoth.

1921.

Braking systems for electrically-driven vehicles (1,422—*157,721*)—British Thomson-Houston Company, Limited.
Welded joints for tramways (3,446—*172,241*)—G. Wallace and H. Bolton.
Balance for sliding window panes of tramcars, etc. (11,956—*162,614*)—R. Mariani.

The Metropolitan Railway, after numerous experiments and exhaustive tests, have adopted as a standard for their country extension lines a type of locomotive which will enable them to accelerate the service. The new time table, which came into force on January 1, shows a substantial reduction on journey times of no less than 75 per cent. of the trains.

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TRAFFIC RETURNS.

Tramway and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1920-21. WEEKS ENDED Dec. 11	Dec. 18	Dec. 25	Jan. 1		1921. WEEKS ENDED Dec. 10	Dec. 17	Dec. 24	Dec. 31		AGGREGATE. Wks.	1921.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	
Aberdeen Corporation	3,656	3,435	3.414	3.693	...	3,750	3.308	3,330	3.429	...	30½	110.560	− 9.459
Aberdeen Motor Buses	...	...	...	...	...	121	120	123	123	...	30½	8.050	+ 7,295
Ayr Corporation	523	521	546	572	...	496	485	523	513	...	33	25.777	− 1,441
Barrow Corporation	835	864	839	933	...	728	729	834	731	...	39	33,754	− 1.754
Belfast City Tramways	11.412	11.355	12.794	9.242	...	12.521	12.831	13.417	12.083	...	39	493.954	+ 45.737
Birkenhead Corporation	2,584	2.705	2 522	2.786	...	2.630	2.696	2.918	2,679	...	38½	103.264	− 11.970
Birkenhead Motor 'Buses	281	324	327	399	...	523	523	609	626	...	38½	27.284	+ 10.766
Birmingham Corporation	33.576	32.853	30.473	31.704	...	29.791	30.554	32 030	25.543	...	39	1,150.820	− 86.089
Birmingham Motor 'Buses	1.881	1.790	1.667	1.750	...	1.783	1.791	1.868	1,465	...	39	79.156	− 226
Blackburn Corporation	2.429	2.161	2.433	2.710	...	2.275	2.271	2.469	2.708	...	39½	95.610	− 8.017
Bradford Corporation	13.872	13.947	12.073	15.443	...	13.535	14.459	14.115	12.862	...	39	539,384	+ 18.697
Burnley Corporation	3.327	3,169	2.788	3.837	...	3.351	3.391	3.594	3.627	...	—	—	—
Burton-on-Trent Corporation ...	590	626	626	724	...	595	603	686	632	...	39	24.800	+ 910
Bury Corporation	2.141	2.153	1.986	2.639	...	2.326	2.302	2.408	2.524	...	39½	97.355	− 3.278
Chatham and District	1.549	1.455	1.750	1.857	...	1.451	1.538	1.689	1.958	...	52	86.658	− 3,422
Chesterfield Corporation	616	579	614	622	...	541	564	581	607	...	39	22.980	+ 36
Chesterfield Motor Buses	850	737	799	869	...	721	758	772	860	...	39	30.332	− 513
Derby Corporation	2.177	2,153	2.175	2.612	...	2.020	2.064	2.443	2.131	...	39	85.215	− 4,897
Dundee City	3.086	3.031	3.026	3.229	...	2.988	3.040	3,129	3.228	...	32½	105.911	+ 7.382
East Ham Corporation	2.204	2,121	2,599	2,083	...	2.074	2.198	2.384	1.951	...	39½	83.427	+ 2.963
Edinburgh Corporation	...	...	...	...	...	11.424	11.724	12 300	12.069	...	33	428.098	+ 12.525
Edinburgh Motor 'Buses	...	...	...	...	...	3.193	3.247	3.404	3.333	...	33	120.116	—
Glasgow Corporation	45.044	44,924	46.507	47,031	...	45.644	46 158	47,089	45.347	...	30½	1.399.986	+ 27,329
Glossop (Urban Elec. Supply Co.)...	243	233	201	286	...	234	253	281	278	...	52	12.635	+ 64
Halifax Corporation	4,176	3,971	4.198	4.276	...	4,017	4,187	3.940	4,570	...	37½	170.522	+ 5.176
Halifax Motor 'Buses	112	98	108	115	...	57	62	62	77	...	37½	3.090	− 1,215
Halifax Railless Cars	...	...	...	...	...	49	48	52	63	...	23	1.324	—
Huddersfield Corporation	5.051	4.872	4.400	6.065	...	4,836	4.828	5.253	5.100	...	40	209.956	+ 11.434
Ilford U.D. Council	1.321	1,286	1.293	1.412	...	1,439	1,503	1,702	1.363	...	39½	59.573	+ 8.091
Ipswich Corporation	753	803	826	968	...	759	805	949	768	...	39	34.539	− 4.325
Isle of Thanet...	417	398	482	654	...	478	536	583	657	...	12½	8.625	+ 1.228
Kilmarnock Corporation	350	332	374	421	...	350	347	369	381	...	32½	12.035	− 71
Leicester Corporation	6.502	6.461	6.207	7.095	...	7.407	7.391	8.029	6.754	...	52	345.971	+ 2.384
Liverpool Corporation	25.436	25.409	26.030	26.454	...	30.034	30.747	32.977	28.763	...	52	1.522.028	+ 101.952
London County Council	102.133	96.756	105.339	94.529	...	89.800	92.816	97,598	85.959	...	39	3.873.835	+ 305.511
Maidstone Corporation	385	360	447	449	...	387	409	467	446	...	38	18.902	− 308
Manchester Corporation	36.701	36.735	32.844	37,598	...	37.733	38.827	39.134	34.222	...	39	1.532.298	+ 199.007
Newcastle-on-Tyne Corporation ...	11.350	11.132	11.107	...	...	10.988	11,174	11.834	...	...	38	436.122	+ 14,691
Nottingham Corporation	7 258	7.105	7.799	6,924	...	7.173	7.445	7,708	7,433	...	39	263,860	− 39,313
Oldham Corporation	4.093	4.241	3.992	4.733	...	4,706	4.627	4,480	4.845	...	41	194.775	+ 4.542
Preston Corporation	1.853	1.739	1.881	1.957	...	1,798	1.891	1,933	2.134	...	38½	74.892	+ 4.483
Reading Corporation	1.503	1.481	1.808	1.618	...	1.478	1.573	1,747	1.778	...	39	62.566	− 2.764
Reading Motor 'Buses	219	221	278	304	...	280	301	336	373	...	39	13.535	+ 3.215
Rotherham Corporation	2.635	2.480	2.666	2.605	...	2.158	2.301	2.363	2.402	...	38	86.198	− 14.987
St. Helens Corporation	2,044	1.838	1.989	2.075	...	1.586	1.709	1.691	1,816	...	39	68.316	− 12.947
Sheffield Corporation...	20.350	20.292	18.838	21.276	...	19.126	18.979	18.919	19.425	...	39½	772.264	− 50.608
Southampton Corporation	3.067	2.854	3.151	2.955	...	2,805	2.896	3,138	2,957	...	39	116.083	− 7.266
Southampton Motor 'Buses	322	285	328	330	...	97	98	107	98	...	39	6.322	− 3.248
Southend Corporation	1.519	1.342	1.521	1.610	...	1,772	1.927	2.038	2.014	...	39	101.497	+ 6.238
South Shields Corporation	1.842	1.797	1.660	1,985	...	1.676	1.691	1.896	1.659	...	40	67.325	− 9.015
Sunderland Corporation	2.886	2.905	2.660	3,068	...	2.532	2,461	2.584	2.681	...	39	104.024	− 17,562
Swindon Corporation	352	328	389	415	...	331	361	388	416	...	38½	15.646	+ 445
Tyneside Tramways and Tramroads	1.122	1,086	1.200	1,105	...	892	930	908	980	...	26	28.228	− 5.073
Wallasey Corporation	2,435	2,517	2,526	2.862	...	2,573	2.653	2,783	2.642	...	39½	111.518	+ 8.724
Wallasey Motor 'Buses	97	112	128	141	...	174	211	208	231	...	39½	9.530	+ 2.648
Walsall Corporation	1.886	1.878	1.857	2.344	...	1.576	1,642	1.882	1.656	...	40	65 008	− 5.453
Walsall Motor 'Buses	1.247	1,231	1,269	1.728	...	886	919	1,039	1 035	...	40	37.110	− 8.041
Walthamstow U.D. Council	1.823	1.751	1.958	2.194	...	1.778	1.867	2.021	1.762	...	39½	82.309	+ 1,235
Warrington Corporation	1.008	967	1.054	952	...	991	1.039	1.104	1.143	...	39	38.814	− 46
West Ham Corporation	6.315	5.967	7.121	6.142	...	5.881	6.269	6.844	5,802	...	39	232,414	+ 7.767
Wolverhampton Corporation ...	2,149	2.399	2.635	2.438	...	2,286	2,440	2,815	2.287	...	40	94.188	− 3.373
Wolverhampton Motor 'Buses ...	444	492	513	579	...	646	692	840	655	...	40	26.285	+ 8,791

Underground Electric Railways Company of London, Limited.

NAME OF COMPANY.	1920-21. WEEKS ENDED Dec. 11	Dec. 18	Dec. 25	Jan. 1		1921. WEEKS ENDED Dec. 10	Dec. 17	Dec. 24	Dec. 31		AGGREGATE. Wks.	1921.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	
Underground Rlys. & L.G.O. Co. ...	...	...	...	...	...	223.015	225,492	232,609	192,964	...	52	12.233.340	—
London and Suburban Traction ...	...	...	...	...	...	48.898	49,715	51,072	45,548	...	52	2.826.535	—

Colonial and Foreign Tramway Traffic Returns.

Companies Issuing Weekly Returns.

NAME OF COMPANY.	1920-21. WEEKS ENDED Dec. 11	Dec. 18	Dec. 25	Jan. 1		1921. WEEKS ENDED Dec. 10	Dec. 17	Dec. 24	Dec. 31		AGGREGATE. Wks.	1921.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	84.948	83.801	82.930	96.157	...	85.923	82.715	85.516	97.287	...	52	4.203.369	+ 188.604
Calcutta ... ... Rs.	93,980	96,825	99.091	90,561	...	98,099	94,279	84,008	83,588	...	52	4,021,233	− 818.256
Madras... ... ... Rs.	...	...	...	...	...	...	...	...	...	...	—	—	—
Pernambuco	5,406	4,955	5.200	4.875	...	3,780	3.409	4,118	4.022	...	52	195,174	—

Companies Issuing Monthly Statements only.

	1920. July	Aug.	Sept.	Oct.	Nov.	Dec.	1921. July	Aug.	Sept.	Oct.	Nov.	Dec.	Wks.	AGGREGATE. 1921.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	
Ballarat & Bendigo	3.690	3.588	4.192	4 442	4.810	...	3.842	3.809	4.231	4.682	5.137	...	32	35.525	+ 2.525
Brazilian Trac. Mlrs	11745000	11837000	12043000	13442000	12199000	...	15477000	15744000	14471000	15016000	14555000	...	48	155.462.00	+33156000
Brisbane	53.300	46.650	45.430	46.310	...	...	48 850	50.675	45.220	47.880	...	...	44	471.920	+ 12.590
British Columbia	$ 788.402	810.608	806.797	835.054	858.842	...	840.155	844.154	845.185	845 973	877.335	...	22	4.252.802	+ 153.099
Buenos Ayres L'c'z	51.508	53.952	53.603	57.619	56.746	62.857	51.944	55.873	55.873	58.492	58.056	63.381	26	343.619	+ 7.333
Burma	52.289	48.553	50.235	55,763	53.696	50.481	43.764	55.168	58.974	64.778	58.271	54.194	22	291.385	+ 32.657
Cape Town ...	23.711	...	23.699	...	25.628	...	25.571	25.164	25.755	26 839	27.004	...	—	—	—
Carthagena & H. ...	4.164	3.721	2.273	3.319	2,714	5,560	1.936	1.773	4.244	3.862	1,717	3.237	52	31.052	− 19.305
Cordoba	20.189	21.028	19.597	19.627	...	...	23.629	23.851	23.204	23.203	...	...	31	162.653	+ 22.646
East India ...	4.081	4 109	4.228	4.299	4,234	...	4.591	4.513	4.154	4.054	3,945	...	17	16.696	− 174
Kalgoorlie... ...	3.194	3.111	3.361	...	...	...	2.350	2,652	2.829	...	...	...	39	20.119	− 7.490
La Plata	5.353	5.715	5.656	6.310	5.573	...	5.425	...	...	6.587	6.453	...	48	58.098	− 3.652
Manila ...	$ 282.260	292.418	280.352	327.652	320.345	...	305.126	297.128	322.212	323.108	306.850	...	48	3.364.545	+ 260.755
Monte Video ...	39.647	42.771	41.816	45.246	43.846	...	42.411	44.672	44.927	47.927	47.426	...	4	47.426	+ 3.580
Para	24.243	24.571	23.174	26.772	24.273	24.253	24.655	22.940	22.225	25.548	23.147	22.660	5	22.660	− 1.593
Port Elizabeth ...	6.106	...	5.803	...	6.620	...	6.515	6.578	6.477	6.788	6.828	...	—	—	—
Rangoon ... Rs.	118.667	117.836	114.857	111.830	104.468	120.000	133.536	133.000	132.225	151.000	137,750	145.500	52	1.628.551	+ 228.798
Toronto ...	$ 1189.315	...	...	...	...	...	1229.483	...	...	...	...	...	31	8.877.669	+ 642.606
Winnipeg ...	$ 391.709	368.616	426.647	444.899	477,957	...	390.109	393.823	417.174	441,315	477.880	...	22	4.910.971	+ 156.466

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COMMERCIAL MOTOR VEHICLES

60,500 MILES WITHOUT HEAVY REPAIRS

Letter Extract from:—
United Automobile Services, Ltd.,
Laundry Lane,
Lowestoft.

Dear Sirs, 16.11.1921.

"I am rather pleased at the record made by your Chassis No. 15363, which was placed in service by us on 1st July, 1920, and which is now about to come in for overhaul.

This chassis has now covered a total of 60,500 miles without coming in for heavy repairs."

Yours faithfully,
(Sgd.) E. B. HUTCHINSON,
General Manager.

See the
A.E.C. EXHIBITS
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THE SCOTTISH MOTOR SHOW
GLASGOW,
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28 to 57 Seating Capacity

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ALL CHASSIS PRICES GREATLY REDUCED

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We invite enquiries for new and reconstructed Chassis

Associated Equipment Co., Ltd.,

WALTHAMSTOW, LONDON, E.17.

Phone - - Walthamstow 780 (9 lines)
Wire - - "Vangastow, Waltstreet, London."

505

BUILDERS OF LONDON'S BUSES

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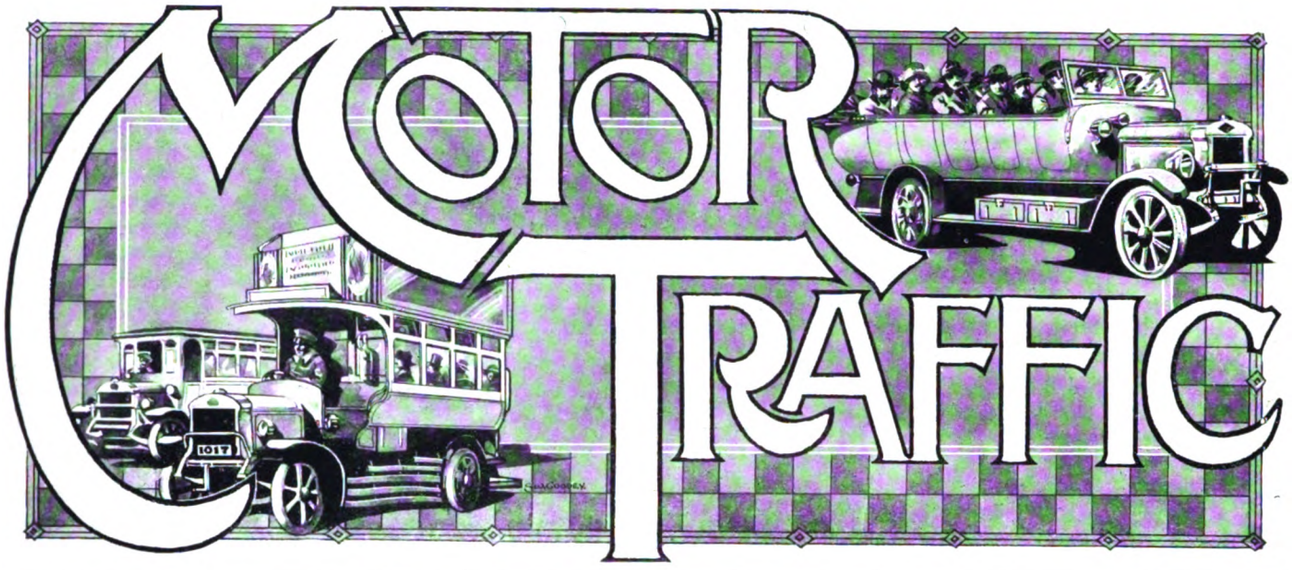

MOTOR TRAFFIC SECTION—SEVENTEENTH YEAR OF PUBLICATION.

RETROSPECT AND PROSPECT.

In view of the general trade depression, the progress made during the past year in the adoption of motor transport must on the whole be regarded as encouraging. The year 1921 has been particularly noticeable for a great advance in respect of the motor coach, both as regards the types and numbers of vehicles employed and the variety of uses to which they are put. It took some time to secure anything like general realisation of the fact that the motor coach has far greater possibilities than its predecessor, the horsed char-a-bancs. Used at first merely for comparatively short pleasure trips, it was only when the railway services were dislocated, first by strikes and then by coal shortage, that the public, and even the motor coach proprietors themselves, began to realise the possibilities of running these vehicles regularly to schedule as means of passenger conveyance from place to place. Given the absence of unduly restrictive legislation, the motor coach is bound to become more and more prominent with every summer season. It is still questionable whether it will ever be seriously regarded as an all-the-year-round conveyance. Even for seasonal use a good deal still has to be done in the way of organised provision for the collection, carriage, and delivery of passengers' luggage. In a recent note reference was made to the possibility of successful local agitations in favour of the closing of certain roads against motor coach traffic. These agitations will not suppress the motor coach movement, but may alter its character, by compelling the use of smaller vehicles and consequently the charging of higher fares. During the past year a fair number of trading concerns have joined the ranks of users of motor vehicles for the carriage of goods. From the standpoint of the manufacturing industry, however, progress has not been satisfactory, and the industry cannot be expected to recover its full prosperity so long as it is subjected to the competition of immense numbers of second-hand vehicles thrown on to the market directly or indirectly by the Government. No good purpose can now be served by reiterating all the old arguments against the system of disposal that was in fact adopted; but the Government still has it in its power to ease the position to some extent by considering the motor manufacturing industry's interests in connection with the disposal of the vehicles still remaining in its possession but not likely to be required very much longer.

RAILWAYS AND ROADS.

It seems certain that the question of the extent of the powers of railway companies to run road motor services will be settled at a fairly early date. Important groups of railways are promoting private bills, seeking extended, though still more or less restricted, powers. Road carrying interests are naturally very apprehensive as to the future. It is almost impossible to conceive safeguards which, while giving the railways the powers sought, would effectively protect independent road carriers against fatal competition. It appears that the railways are willing to undertake not to manufacture motor vehicles for themselves in the near future. This would mean that, if they became large motor users, they must in the first instance purchase from existing motor manufacturers. Their orders would, of course, be just as welcome to the manufacturer as would the orders of road carrying concerns, with the exception that the railways, on account of their size, will no doubt be able to insist on the most favourable possible prices, cutting the manufacturer's profit to a minimum. It is, moreover, difficult to see how any provision could be made to prevent the railways from promoting more or less independent but still subsidiary manufacturing concerns. Equally, assuming that the railways are not granted the powers they seek, it is difficult to see how they can be prevented from attaining their ends by other means, creating road carrying concerns closely allied to them, but not subject to the statutory obligations imposed upon the railways themselves. Undoubtedly there will be considerable opposition to the railways' proposals; but when all things are considered one questions whether such opposition can be permanently successful, and whether it would not perhaps be better to let the railways have their own way and run their own services rather than to encourage the adoption of various roundabout methods to attain the same ends.

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MOTOR TRAFFIC

FUEL CONSUMPTION AND ROAD CONDITIONS.

Reference was made in last month's notes to the importance of keeping records of the performance of vehicles. Some users make the mistake of thinking that the only record necessary to keep is that of fuel consumption. This is a mistaken view, but nevertheless records which do no more than indicate regularly the fuel consumption of each vehicle are of very distinct value. The amount of petrol issued to each vehicle should be regularly chronicled, and periodically the fuel consumption should be worked out in miles per gallon. The resulting figures may be charted on squared paper, and the curves thus obtained will show very promptly if there is a serious falling off in the efficiency of one or more of the vehicles. The mere fact that petrol consumption per mile is found to increase is not in itself conclusive evidence that the vehicle needs attention. The increase may, for instance, be due to the condition of the roads or to the density of the traffic. Some increase of petrol consumption must be expected during the winter and during any time when traffic is particularly congested. These fluctuations will, however, affect all vehicles alike, and it is therefore particularly when the curve for one vehicle shows clear signs of differing from the curves of other vehicles that investigation is required. To a certain extent records of fuel consumption will serve also to indicate the efficiency of drivers. Some men will habitually obtain better results than others, but before jumping to conclusions it is necessary to be quite certain that the fault is not with the vehicle rather than with the driver. Vehicles that are apparently identical are not all capable of showing the same fuel economy.

THE SOURCE OF POWER.

It is rather a curious thing that, while the petrol vehicle is on the road in far greater numbers than steam or electric vehicles, it is on the whole easier to state a case on behalf of either of the two latter. Thus the electric vehicle has several marked advantages, including silence, smooth acceleration, and retardation, cleanliness, absence of smoke, ease of control, and so on The outstanding advantage of the steam vehicle is, of course, the comparatively low price of its fuel, but this is an item of first importance. On the other hand, the limitations of the electric vehicle are fairly obvious, and however satisfactory it may be from the standpoint of cheap maintenance and ease of handling, its limited radius of action must always prevent it from being a serious general competitor except in certain more or less limited spheres. The electric vehicle naturally appeals strongly to municipalities which own electric power-stations, and so are able to supply their own vehicles with fuel at low cost and at the same time to provide work for the power-station during the periods of light load. The electric also deserves far wider recognition than it has yet received in this country for such work as retail deliveries in towns where the mileage involved is not large and the number of deliveries to be made is considerable. On a round of this sort its average speed is probably no less than that of the petrol vehicle, while on an open road the petrol vehicle has a marked advantage. The main limitation of the steamer is that, for a variety of reasons, it can only be satisfactorily produced in a limited range of sizes. It has never proved a serious competitor of the petrol vehicle for loads much under three tons. Minor disadvantages are the bulk and weight of its fuel supply and of the water that must be carried and the fact that the water supply needs replenishing from time to time, and the continued efficiency of the vehicle therefore depends to some extent on the quality of the water available at a variety of points. The nature of the fuel and the need for carrying fairly large stocks of water is not the only disadvantage, inasmuch as these supplies occupy space which could otherwise be devoted to useful load. There is the additional disadvantage that, given a maximum legal weight of a laden vehicle, the heavier the supplies the smaller is the margin left for useful load.

Perhaps, however, the biggest advantage possessed by the petrol vehicle is the natural consequence of its suitability for all sorts of work. Because it can be used for carrying any load from the lightest to the heaviest, it is in such general use, irrespective of considerations of comparative economy, that there is hardly a village in the United Kingdom where one cannot pick up the necessary supplies or obtain some sort of mechanical assistance. The other extreme is represented by the electric. Here we have a machine which very seldom fails on the road, but if it does there are comparatively few people capable of tackling the job of putting it right. If a complete network of service stations for electrics could be established all over the country, so that assistance in respect of repairs would always be obtainable, and charging facilities would be everywhere available, then the electric would become a very serious competitor of the petrol machine for all loads and purposes. Before this can happen, however, the development must pass through intermediate stages during which the facilities in support are few and far between, and the cost of current for charging purposes is extremely variable. The trouble is that the complete network of service stations could not be remunerative unless very large numbers of vehicles made regular use of it, and, on the other hand, it is not likely that a very large number of vehicles of this type will be put on the roads until such stations are available. Each development waits on the other with the result that neither can mature.

A TRIBUTE TO BRITISH VEHICLES.

Less Costly to Run than Foreign Machines.

A firm using a large number of British made motor vans sought to effect an economy by purchasing foreign made chassis at about £200 less than the cost of the make that they had hitherto used with success. Allowing for depreciation, etc., this meant an estimated advantage for the foreign machine of about £35 per annum. It has been found—solely as a result of keeping separate and not *en bloc* motor accounts—that the average operating cost per mile of the British vehicles is no less than 5d. per mile lower than the average cost of the newer foreign vehicles, the average mileage of each motor being approximately 12,000 per annum. A saving of 5d. per mile represents an economy of £250 per annum. Deducting the anticipated saving of £35 per annum on each of the cheaper vehicles, there is seen to be a net advantage in favour of the type originally employed of no less than £215 a year. If these records had not been kept and analysed for a special purpose, the vehicle owner might have been a long time discovering what has now been made clear—i.e., that he will effect an economy by selling his foreign vehicles and substituting therefor motors of the type that were originally employed.—*Birmingham Daily Post.*

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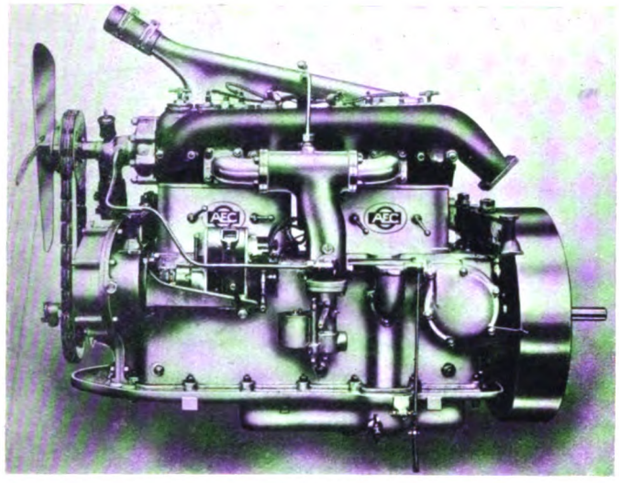
MOTOR TRAFFIC

A.E.C. 45-H.P. 5-TYPE ENGINE.

DETAILS OF A NOTABLE DESIGN BY THE WALTHAMSTOW WORKS.

Through the courtesy of the Associated Equipment Company, Limited, full information is now available of their new 45 H.P. 5-type internal combustion engine. A brief specification is as appended—

Bore, 120 mm.; stroke, 150 mm.; H.P., 45 at 1,000 revolutions per minute; R.A.C. rating, 34·6 H.P.; valves on one side; 3-point adjustable chain drive for camshaft and magneto; combined pump and fan driven by 1 in. V belt; pump and trough lubrication



A.E.C. New Engine for Lorries and Coaches.

with level adjustment; aluminium alloy pistons; enclosed fool-proof governor; Zenith carburetter; Peel Conner impulse starter magneto.

RESULTS OF EXACTING ROAD TESTS.

During the war period the Associated Equipment Company supplied over 13,000 4-ton lorries to the British and Allied Armies, these vehicles being fitted with a proprietary engine standardised by the Ministry of Munitions for several types of vehicles for army use. In accordance with the progressive policy of the A.E.C., it was decided, soon after the termination of the war, to embody in their programme an improved design of engine suitable for 4-ton commercial vehicles and luxurious coach chassis. The result of this policy is to be seen in the new engine which is the subject of this notice.

All the features embodied in the design have been thoroughly tested both in engines fitted in the London General Omnibus Company's omnibuses, and in experimental engines of the new type which have been running in vehicles used by the Associated Equipment Company in connection with their service and stores systems for nearly twelve months, and the engines are now being manufactured at the Walthamstow works in quantity. In ordinary daily work A.E.C. lorries fitted with this engine have been giving between 50 to 60 ton-miles per gallon of fuel, and averaging 700 miles per gallon of lubricating oil.

The four cylinders, cast in pairs from best quality grey cylinder iron, have a bore of 120 mm., and with a piston stroke of 150 mm. develop a minimum of 45 H.P. at 1,000 revolutions per minute before passing test. This is equivalent to a brake mean effective pressure of 85 lb. per square inch at 800 revolutions per minute; the brake mean effective pressure reaches 90 lbs. per square inch, an unusually high figure for a commercial vehicle engine.

COMMERCIAL ESSENTIALS STUDIED.

The poppet valves, of special alloy steel, are arranged on one side of the engine, and open into an "L"-shaped combustion chamber, the shape of which received considerable attention when the engine was designed, to ensure a high power output at normal working speeds. The sizes of the valves and induction pipes, together with the timing setting, are arranged to give maximum torque with economical fuel consumption over the working speed range. No attempt to obtain high power at very high speeds has been made, since this can only be effected at the expense of the more useful pulling power at lower speeds which, for commercial work, is most essential.

The aluminium crankcase, which is extended below the crankshaft centre in order to provide maximum stiffness, carries the 3-bearing crankshaft running in white metal lined bronze bearings, which are mounted in registered aluminium caps with steel stiffening plates. The main bearing bolts are screwed into the crankcase from below and continued through the case, being finally locked by nuts at the upper end. The crankshaft is manufactured from a nickel chrome steel stamping suitably heat treated, all bearing surfaces being ground to accurate dimensions. It is balanced dynamically on a Norton balancing machine.

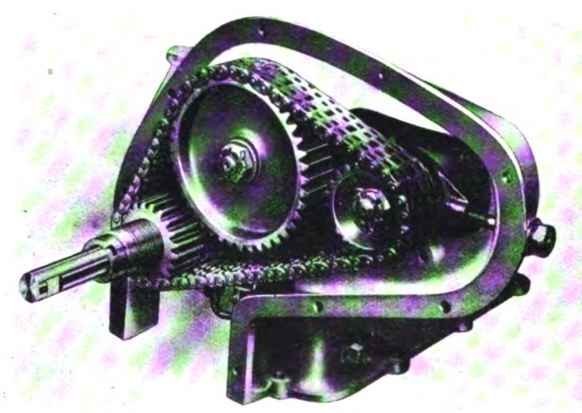
The connecting rods are made from "H" section steel stampings, and carry aluminium alloy pistons, the gudgeon pins being clamped in the rods and working direct in the pistons. This construction has been found to be highly satisfactory, the aluminium alloy forming a perfect bearing metal for the pins.

The bearings are lubricated by oil collected from the cylinder walls, and directed by suitable oil holes to the bearing surface, the latter, owing to the special pin fixing, being unusually large in area. Four cast-iron piston rings are fitted, three at the top and one at the lower end which acts as an oil scraper. Below the third ring from the top an oil relief groove is machined in the piston with suitable escape holes. The piston clearances have been very carefully fixed, and the pistons themselves are free from slap and have no tendency to seize. The arrangement of rings and grooves in the pistons allow for ample lubrication of the cylinder walls with a very low oil consumption.

CHAIN ADJUSTMENT WITHOUT MAGNETO DISTURBANCE.

The valves are actuated by cams, which are integral with the camshaft. The cam profiles are accurately ground to shape after hardening, very close limits of accuracy being worked to. The camshaft, which runs on a roller bearing in front, and plain bearings at the centre and rear, is fitted with a double ball thrust locating bearing, and is driven by a silent chain from the crankshaft. The drive is a triangular one, the chain also passing over the magneto driving pinion; the latter is built up with its bearings and magneto platform in one unit, and is arranged to slide to adjust chain tension.

This construction allows for chain slackness to be taken up quickly and without disturbing the alignment of the magneto, which is a Peel Conner fitted with an impulse starter, and driven through a rubber coupling with vernier adjustment for accurately setting the firing point. As it is possible after long use that the spring in the impulse starter may fracture, provision has been made for



The Wide Timing Chain with Adjustment.

a small set screw (which is permanently in readiness on the magneto) to be removed from its temporary position and screwed into a specially tapped hole in the coupling, which is thereby locked in the normal running position. It can remain thus until a convenient time for replacing the starter spring.

The water pump is bolted direct to the front cylinder and is driven by a 1 in. whittle belt from the crankshaft. The pump spindle is extended to drive the fan, which is an aluminium casting, the blades being formed to induce a horizontal draught from the

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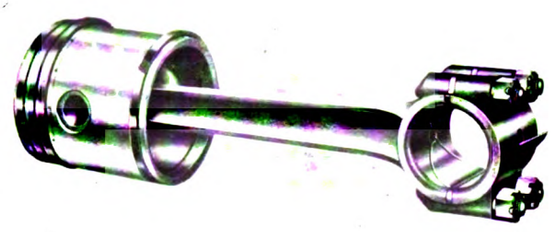
MOTOR TRAFFIC

radiator without producing a centrifugal action on the air current. The pump has a connection on the suction side to the induction pipe water jacket, and draws hot water from the cylinder top cover through the jacket, which is extended sufficiently far along the induction pipe to ensure satisfactory vaporisation of the mixture supplied by a Zenith carburetter.

THE FOOL-PROOF GOVERNOR.

Above the carburetter is a butterfly valve in the induction pipe, operated by a centrifugal governor driven by skew gearing from the camshaft. The governor is of robust construction, the weights being very heavy and the spindle running on ball bearings. Friction of the operating mechanism has been eliminated as far as possible

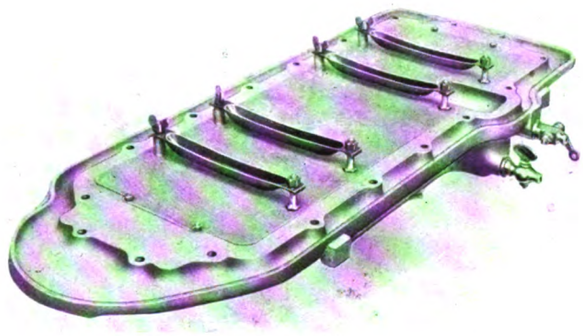


Connecting Rod and Piston—Showing Solid Dipper and Shims.

and all connections are totally enclosed, the whole system being protected from interference by unauthorised persons, who cannot tamper with the adjustment without dismounting covers which can be sealed when necessary.

The governor operates with perfect smoothness without hunting or snatching, and when on the road its action is unnoticeable. The speed adjustment is set approximately 1,400 revolutions per minute, thus allowing a reasonable road speed on low gears. There is no advantage in governing to a road speed of 12 miles per hour on top gear to the detriment of speed on lower gears, and the setting arranged for prevents the engine being mishandled by careless or reckless drivers, but does not prevent reasonable average vehicle speed being maintained.

Lubrication is by the pump and trough system. A gear pump driven by skew gear from the camshaft depends into the oil sump, the pump and drive being wholly contained in the top half of the



Crankcase Oil Sump—Showing Large Area Filter and Adjustable Trough.

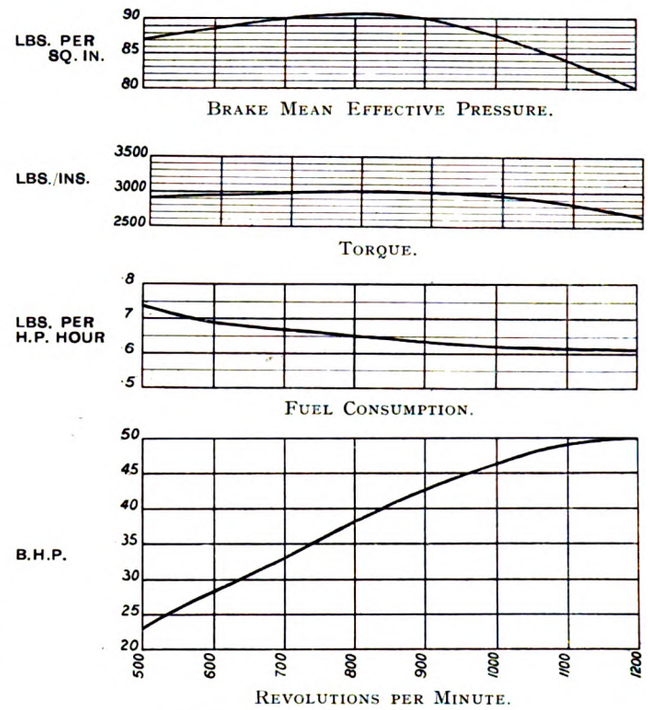
crankcase. Oil is forced to a gallery pipe which feeds the troughs under the big ends, and also the main bearings, by means of direct connecting pipes. The main bearings have also splash cups provided.

ENGINE SUITABLE FOR EXISTING CHASSIS.

Dippers, machined integral with the connecting rod cups are arranged to dip in the oil in the troughs and distribute lubrication to the big ends, cylinders, and other working parts of the engine. The troughs themselves are steel pressings, and are individually adjustable for level by wing nuts, accessible through the two circular engine doors on the offside of the crankcase.

The oil passes through two filters before entering the pump, one being a perforated zinc sheet covering the whole area of the lower half of the crankcase, and the other a detachable gauze filter directly connected to the pump inlet. The filter is removable through the side of the sump, and is retained in place by a screwed cap and spring, the latter holding the filter casing on its seating.

The engine is arranged to be suspended in the chassis by two overhead stamped steel cross members. The front member is



A.E.C. 5-Type Engine Records.

attached to the crankcase by an extension of the front main bearing bolts, and the rear member by two bolts passing through the main crankcase casing at its extreme width. The suspension thus provided is of the semi-three-point type that has proved to be highly satisfactory in A.E.C. vehicles for many years. It relieves the crankcase from strain due to frame flection, without being sufficiently flexible to loosen water connections.

Complete with cross members and flywheel (weighing 1 cwt. 3 qrs.), the engine weighs 8 cwt. 3 qrs., and sells at £275 retail. The engine can be fitted to existing A.E.C. 4-ton vehicles with very little alteration to the chassis, full particulars of which will be readily supplied by the makers.

RAILWAYS AND ROAD TRANSPORT.

POWERFUL GROUP'S APPLICATION FOR POWERS.

A Bill to be promoted next session by the North Western and Midland Group of Railways contains a clause to enable them "to provide, own, work, and use omnibuses and motor cars and other road vehicles to be worked by electrical, mechanical, animal, or other power for the conveyance of passengers, passengers' luggage, parcels, animals, and goods." Opposition will be offered by motor manufacturing and operating interests on the ground that the powers sought would enable the companies to manufacture their own vehicles and to so manage road transport with the aid of the railway profits that they will obtain a monopoly of road transport.

U.S.A. RAIL CAR AND OMNIBUS COSTS.

The White Motor Company, of Cleveland, U.S.A., predict that in the immediate future there will be a great development of business with street railway companies that are now operating at a loss. The White Company assert that the cost of electric rail car operation is about 3 dollars a mile, while it is less than a dollar with a petrol engine. Many inquiries, the company state, are being received from inter-urban tramway companies about types of engines and cost.

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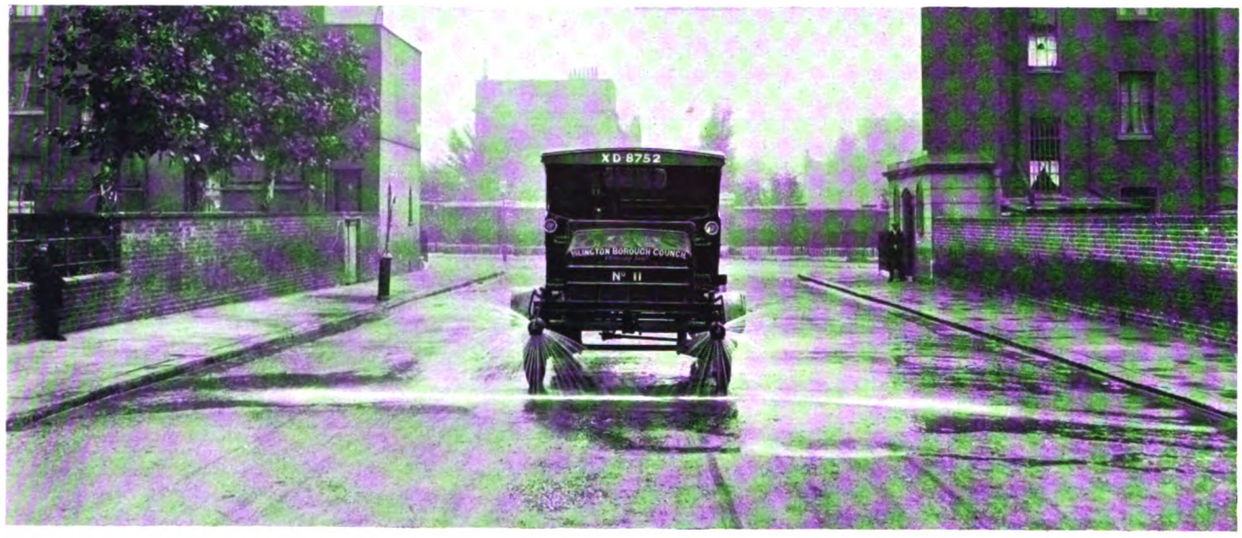
MOTOR TRAFFIC

ELECTRIC VEHICLES FOR STREET WATERING.

The electric vehicles which are here illustrated were supplied to the Islington Borough Council by Electricars, Limited, of Seymour Place, London, W., and are arranged to serve the dual purpose of street watering and house refuse collection. A fleet of eight vehicles is now in service, and we understand that very satisfactory results have been obtained from their use, showing substantial saving in the cost of the work done. The chassis employed is the makers' latest design, known as the "E.A." type, and embraces all the improvements which experience in electric vehicle manufacture has evolved. An alteration of considerable importance has been made in the braking system, as both brakes in the new models are of the external expanding type acting on the rear wheel. As will be seen from the illustrations there are two driving motors and these, as well as the controller box, are mounted on the outside of the chassis frame, thus providing easy accessibility. Great importance attaches to this feature of the chassis design, for a considerable saving in labour costs as well as in the time a vehicle is out of service is effected whenever adjustments or replacements are found necessary. The Edison standard steel accumulator is the battery installed in these vehicles, each of which is covered by the makers' guarantee of 60,000 miles or for a period of eight years. Accessibility is again a feature in the positioning of the battery, for this is carried partly in a compartment arranged in the front of the chassis under a bonnet, free access being obtained by raising a section of this from either side, and partly under the driver's seat in a steel compartment to which access is also easy.

The cylindrical steel water tank has a carrying capacity of 750 gallons, and is provided with two baffle plates inside to prevent the water developing an excess of sway while travelling. In order that the driver may have a complete view of his work, the sprinkler gear is mounted in front of the vehicle. A spray of 21 ft. in width is obtainable, and, as the accompanying photograph illustrates, a good wide road can be well watered. This, however, can be regulated to suit the varying conditions of the service.



Edison Electrical Vehicle for Street Watering—Islington Borough Council.

Islington Borough's Fleet of Edison Electric Vehicles for Street Watering.

Perhaps one of the most notable features of the equipment is the fact that by means of a sub-frame the water tank is rendered interchangeable with an electrically operated tipping body. This is obviously a great advantage, as in the case of the vehicles under consideration they are used for house refuse collection in the winter months and road watering in the summer. The sub-frame is of a most substantial character, and is built up of rolled steel of channel section with suitable cross members, giving an overall width of 5 ft. 6in.

The following is a brief specification of the "E.A." chassis. The frame is of the built-up type, the side members having two high tensile steel flitch plates with well-seasoned American ash filler pieces. The cross members are of solid drawn steel tube anchored to the side members by means of machined steel brackets. The front fender is of heavy section English oak faced with steel plate, the whole frame being braced by tie-rods of high tensile steel with provision for adjustment.

The rear axles are of 3 per cent. nickel steel specially heat treated, the front axle stubs being of an alloy steel drop forgings, also heat treated. The springs are of exceptional length and resilience, and are of the semi-elliptic type. The forged ends are bushed and fitted with screw-down grease cups, the shackle pins being case-hardened and ground to fit. The steering gear is totally enclosed, and is of the worm and sector type, the worm being of hardened steel with phosphor bronze sector of heavy type. Transmission is by twin motors driving the rear wheels independently, the first stage by internal gear on motor shaft, and thence by floating cardan shaft to bevel pinion and crown wheel rear axle. The universal joints are all fitted with ball bearings. The motors are of specially designed four pole series traction type, normal rating 45 amperes, 60 volts. They are designed to stand an overload of 100 per cent. for a period of 30 minutes without dangerous rise in temperature. A patent new design of controller is fitted; this is of the flat plate type, totally enclosed. It is easy of access for inspection and is arranged for a quick break on each speed. A hand-operated safety switch is mounted on the dashboard, this being arranged with three positions—running, neutral, and charging.

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MOTOR TRAFFIC

MOTOR VEHICLES FOR MUNICIPALITIES.

WILLESDEN URBAN COUNCIL have plans for a central fire station.

LEYTON URBAN COUNCIL are purchasing two 2½-ton electric vehicles for refuse collection.

WALTHAMSTOW URBAN COUNCIL have prepared plans for the erection of a new fire station.

COOMBE AND MALDENS URBAN COUNCIL are inviting quotations for the supply of an electric vehicle.

LANCASTER WATCH COMMITTEE recommend the purchase of an Aldsmobile chassis at a cost of about £350.

CHELSEA BOROUGH COUNCIL have decided to experiment with motor vehicles suitable for municipal work.

GLASGOW WATCH COMMITTEE recommend the purchase of two Dennis six-cylinder turbine motor fire engines at £1,860 each.

PRESTON CLEANSING COMMITTEE have adjourned the consideration of further tenders for the supply of motor tipping wagons until March.

THE FIRE BRIGADE COMMITTEE of Heston and Isleworth Urban Council recommend the purchase of a combined motor fire engine and escape.

GLASGOW GARAGE COMMITTEE have asked the manager to obtain estimates of the cost of two 4-seat 12 H.P. open cars for the garage department of the Corporation.

GLASGOW CORPORATION LABOUR COMMITTEE, having further considered the desirability of undertaking their own cartage work, recommend that no action be taken.

SYDNEY (N.S.W.) MUNICIPAL COUNCIL have decided to purchase an American Studebaker pneumatic street flusher. The cost, delivered in Sydney, is estimated at £700.

TYNEMOUTH CORPORATION have instructed the cleansing superintendent to submit a report showing the comparative cost of removing refuse by horsed vehicles and by motor vehicles.

JOHANNESBURG MUNICIPAL COUNCIL, to enable comparison to be made between mule and motor transport, have decided to purchase a Clayton wagon for £1,450; a Sentinel wagon for £1,600; and a Yorkshire wagon for £1,575.

LONDON COUNTY COUNCIL have purchased a second-hand, rebuilt standard 12-16 H.P. Sunbeam car, with accessories, for £400. It is for the fire brigade service, and the Council mention that some of the service motor cars have been in use for over ten years.

WHEN A GIANT PNEUMATIC BURSTS.

EXPERIMENTS AT HIGH SPEEDS.

At the instance of *Motor Transport*, the Goodyear Tyre and Rubber Company conducted experiments with a 4-ton van running on giant pneumatic tyres for the purpose of observing the result of punctures. One of the front wheels was first run over two spikes with sharpened ends set obliquely in a thick iron plate fixed down to a board of ash. The spikes were on a slant. The speed of the lorry was 27 miles an hour, and the tyre burst instantly. Within eight feet past the spikes it was completely flat. The vehicle was kept under control so easily that the driver was able to steer round pot-holes in the road 20 yards from the bursting point, and he stopped without difficulty. The drop of the lorry on the burst tyre side was only 4¾ in. The tear in the cover was 4 in. long, and the slit in the tube 5 in. By means of a cord an assistant standing in the road withdrew the spiked board before the rear tyre passed. After a new front tyre had been fitted, several attempts were made to puncture a rear tyre, the driver having to miss the spikes with the front tyre and swerve across to hit them with the rear. Several attempts at 35 miles per hour proved futile, and on the speed being lowered to 15 miles the spikes caught the edge of the tyre. There were two 1 in. slits, the air taking 20 ft., or roughly one second, to escape. The vehicle was loaded with two tons of ballast. It was pulled up without mishap.

TRACTION COSTS AT YORK.—The appended quarterly statement has been issued, showing the receipts and expenses per car-mile of the municipal traction services—Omnibuses, receipts 15·85d., expenses, 17·97d.; tramways, receipts 21·57d., expenses 16·59d.; railless vehicles, receipts 17·17d., expenses 11·48d.

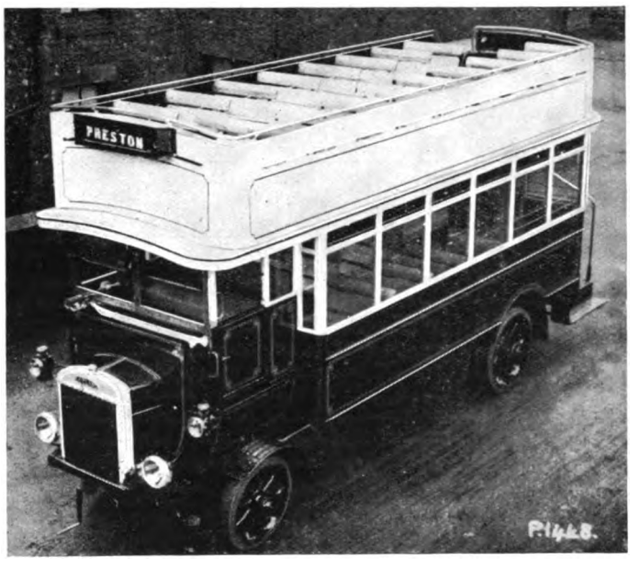
63-SEAT LEYLAND OMNIBUS.

A notable feature of the new Leyland omnibus with the largest passenger carrying capacity in the world is its lack of a cumbersome appearance. As the accompanying photographs indicate, the body is of pleasing design, while constructed on lines giving the greatest possible strength.

The body is mounted on one of the new O.P. type chassis—one of the Leyland Motor Company's overtype models—fitted with a 40-48 H.P. engine and their usual transmission, with the addition of an auxiliary spring device on the rear wheels. This spring is so designed that it will adjust itself to any load of body weight. When the omnibus is running light the small auxiliary spring, which can be seen in the photograph on the following page, comes into operation and avoids any great shock on the machine. When, however, the vehicle is fully loaded, this spring is locked tight and the load is taken by the usual semi-elliptic springs in the ordinary way.

This type of machine—known as the overtype—allows a very much larger body space to be taken without necessarily increasing the overall length. In the case of this particular machine the body space is 16 ft. 9 in., and its overall length 27 ft.

The seating accommodation is such that it will allow for 28 passengers inside, eight seats of which form a smoking compart-



ment. The top deck accommodates 34. The precise arrangements are indicated in the diagram. There is a very large platform at the rear, which allows plenty of room for passengers entering the interior or climbing the stairs, without any possibility of undue congestion.

The panelling of the body is entirely made of wood. One of the great advantages resulting therefrom is that there is no possibility of any drumming occurring, as is sometimes the case when metal panels are used. The interior is finished in a selection of mahogany and ash. The roof is of 3-ply maple-faced wood, which, combined with the rattan upholstery and the exterior, presents an extremely handsome appearance. The omnibus is fitted with the usual equipment, and has the standard 12-volt electric lighting set.

SMOKE FROM STEAM VEHICLES.—A deputation from the Horse and Motor Contractors' Association has waited upon the Parliamentary Committee of the Glasgow Corporation to express objection to the proposal to seek power to impose penalties in respect of the emission of smoke from mechanically-propelled vehicles. The deputation urged that because of the difficulty in getting a suitable fuel the proposals were too stringent, and suggested that the existing powers of the Corporation were sufficient to deal with the subject. The deputation also objected to a clause as to lights on vehicles on the ground that it was not necessary for slow-going vehicles to carry lights in streets which were lighted. The committee decided to make no alteration in the clauses.

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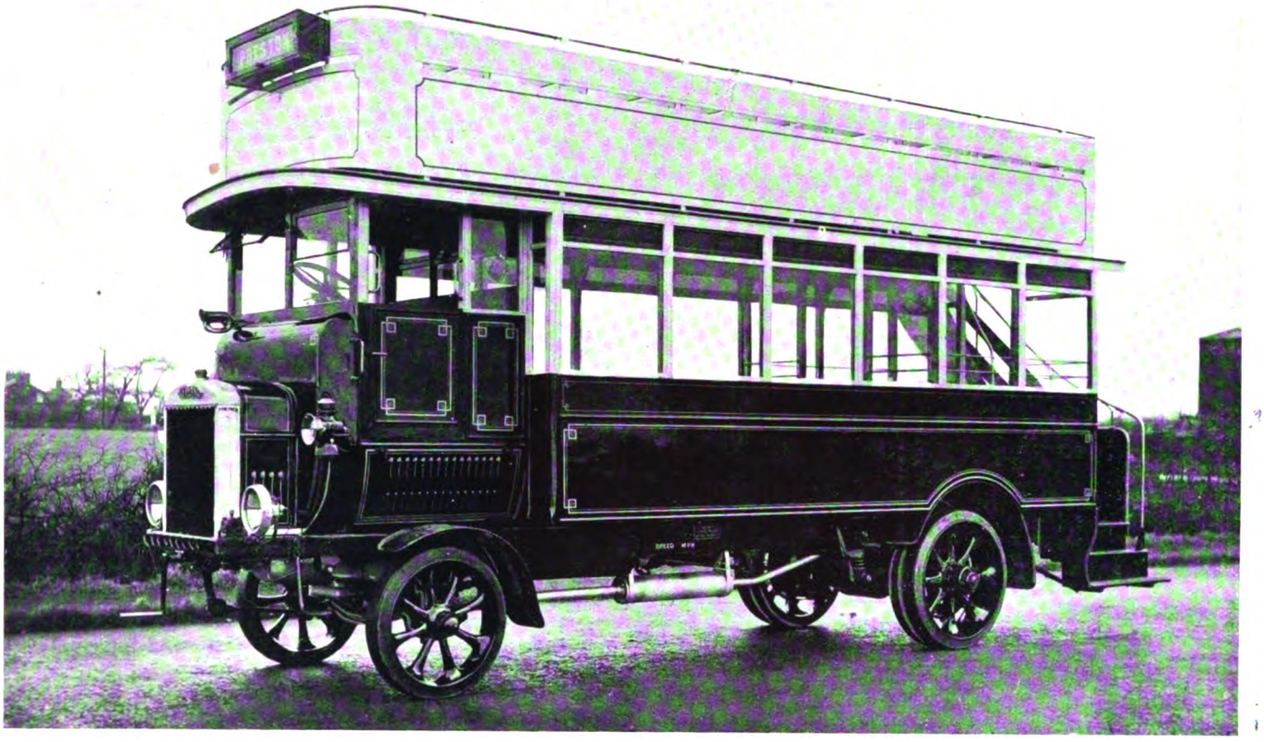
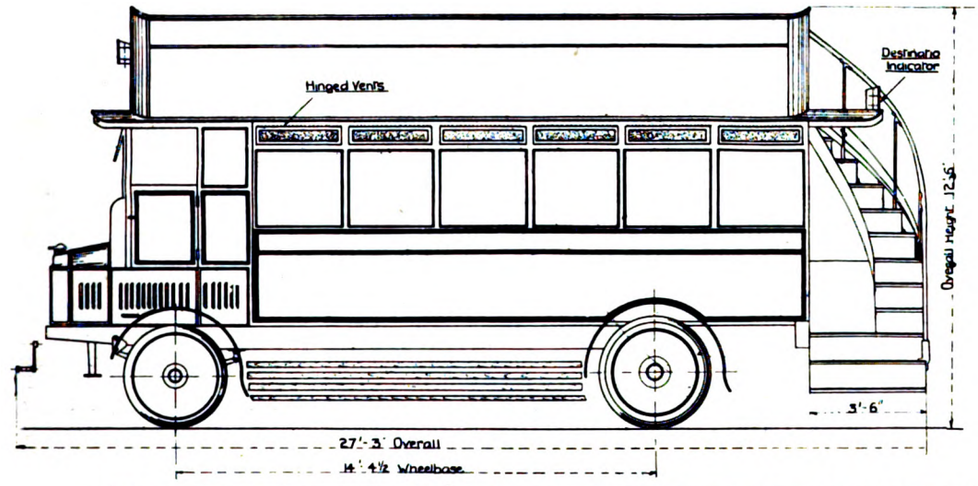
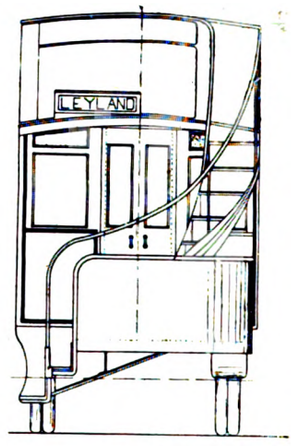
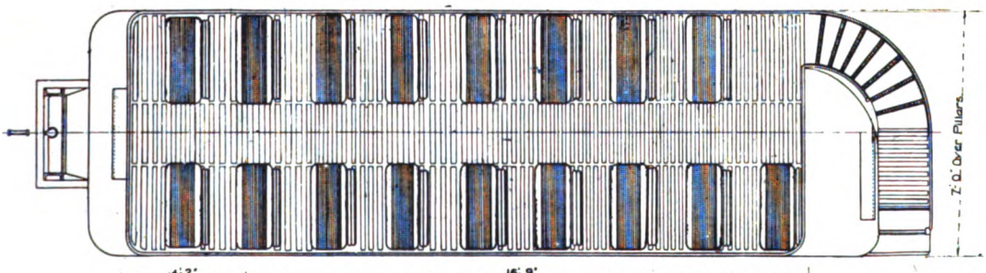
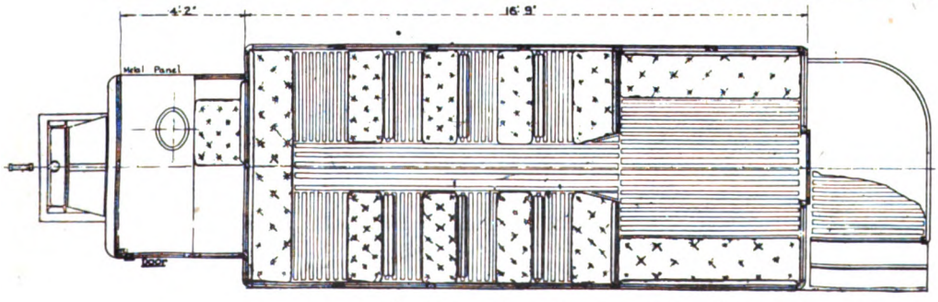


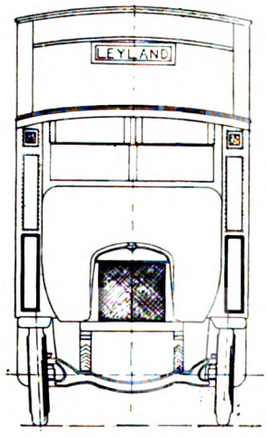




REAR END ELEVATION.







FRONT ELEVATION.

Leyland Omnibus Providing Seats for 63 Passengers.

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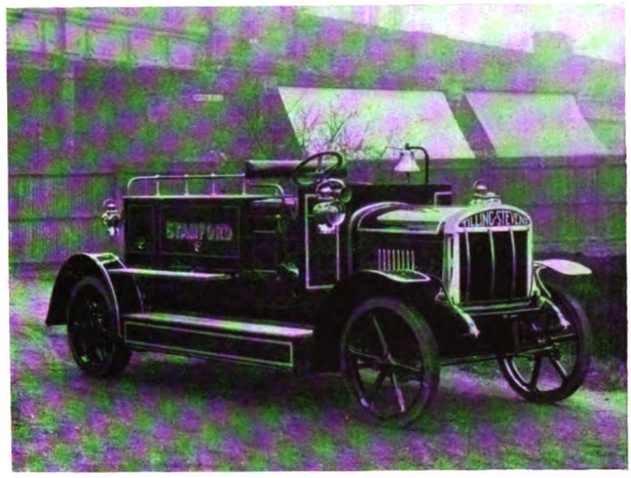
MOTOR TRAFFIC

TILLING-STEVENS FIRE TENDER.

The accompanying photograph depicts a recent delivery to the Stamford Fire Brigade of a Tilling-Stevens motor fire tender, supplied by Tilling-Stevens' Motors, Limited, of Maidstone. The body, a fine example of its kind, is mounted on a Tilling-Stevens T.S.B.4 gear-driven chassis, fitted with a drawbar coupling and other specialities. Chief among the uses to which this fire tender is put is that of drawing a steam fire engine. As a test of sturdiness



Stamford's Tilling-Stevens Fire Tender.

and reliability the vehicle was driven over a give and take route of six miles, carrying 13 men, and hauling the steam fire engine, weighing 2 tons 5 cwt. During this run the lower gear was not put into operation once. As a further test, the fire engine was uncoupled, and with the same complement of men a speed of 30 miles per hour was easily attained. The roads, during these tests, were in a greasy condition, a further reason why this should be considered a creditable performance.

LONDON OMNIBUS ENTERPRISE.

PARKING OF VEHICLES FOR THEATRE TRAFFIC.

With the approval of the police the London General Omnibus Company on December 29 initiated an experiment in parking omnibuses ready to move into the West End theatre region on the conclusion of the evening performance. At the outset only 70 omnibuses were utilised, but as experience is gained the number in a few weeks will increase to hundreds, thus enabling the West End to be expeditiously cleared of people on the look out for vehicles to take them home.

The test began with parking the omnibuses just before 10.30 p.m. in Great Marlborough Street, Soho Square, Lincoln Inn Fields, Aldwych East, and the Victoria Embankment at Charing Cross. A staff of regulators provided by the company despatched the vehicles from those centres.

The operation has been made possible by the rather long-delayed consent of Scotland Yard, and the recent re-arrangement of the spreadover of the employees, and it is anticipated that the plan will ultimately effect a considerable saving in fuel and labour, a result that is greatly needed in view of the continued high cost of operation.

It is not to be assumed that the omnibuses on the stroke of the clock swoop down upon theatreland. Except where a place of amusement is situated on an omnibus route there is no "invasion" by the parked vehicles, which simply augment existing services at the rush hour. It is a police stipulation that the concession shall not create congestion. The period of waiting at the parking places is very short; it is not to the interest of the company that the men and machines should be standing idle. Not the least benefit of the innovation is the relief likely to be afforded to the Underground Railways and to the congestion at the stations.

THORNYCROFT'S GOOD YEAR.

Sir John E. Thornycroft presided at the twentieth annual meeting of John I. Thornycroft and Company, Limited, held on December 19 at Winchester House, E.C. In moving the adoption of the report and accounts, the chairman said there had been a profit for the year ended July 31 last of £74,208, and in view of the conditions in existence during the year he thought they might congratulate themselves upon the results. They had brought into the accounts £53,169, and after payment of the dividend now recommended, they would carry forward £57,747 to the credit of next year's account.

Referring to the motor vehicle side of the business, the chairman said they had a good demand for spare parts due to the large number of their vehicles now in use, and for some years now they had been able to deal with the repairs on an extensive scale at the branches established in London, Leeds, Manchester, and Glasgow. All these branches were excellently equipped, and carried a large stock of spare parts so as to enable the company to supply promptly. They had agents all over the country stocking spare parts, and as they also ran a travelling inspection staff, he could confidently assert that no other commercial vehicle manufacturer had anything approaching such a complete scheme for giving service to the user. As to the class of vehicle produced by the company, it was well known that they had a great success as regarded war work, but this autumn they decided to enter their more recently produced 2-ton vehicle for a road trial under the observation of the Royal Automobile Club. They selected the route from London to Land's End, thence to Scotland, and then back to London, a total distance of £1,260 miles. The total weight with body and full load was 5 tons 6 cwt. 2 qr., and the petrol consumption 13 miles to the gallon, or 69·3 ton-miles to one gallon. No other manufacturer had produced a vehicle approaching this performance, and it was a great satisfaction to the directors when they were advised that the Royal Automobile Club had awarded the company "the Dewar trophy for the most meritorious performance of the year in any certified trial." The depression had been made a good deal worse for vehicle manufacturers by the continued disposal of the surplus war stock, but the company had had quite its full share of the sales that had been made, and they would continue to hold their own.

BRISTOL COMMERCIAL VEHICLES.

The illustration shown below depicts a 40-H.P. "Bristol" lorry supplied by the Bristol Tramways and Carriage Company, Limited, to Messrs. Challicom and Company, of Clevedon. The products of the Brislington motor works are built upon experience gained by the Bristol Tramways and Carriage Company in operating and

"Bristol" 40-h.p. Lorry, with Enclosed Cab.

constructing motor vehicles for many years past. This statement applies to both passenger and commercial machines. The company is particularly well situated for supplying any class of body. The advance made in the construction of lorry bodies is shown in the illustration. Nowadays very few lorries are without the enclosed cab for the driver, thus increasing the utility of the machine during the winter. This type can be had either as a permanent fixture or convertible into the open seat.

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MOTOR TRAFFIC

OMNIBUS SERVICES.

BIRKENHEAD.—In the event of the Lower Bebington and Bromborough Urban Councils not agreeing to the Corporation's proposal to run omnibuses to those places, the municipal authority will take steps to have the matter settled by arbitration.

BROMBOROUGH.—The local authority have informed Mr. J. M. Hudson, who applied for licences to run omnibuses, that the district is already efficiently served by the Crossville Motor Company, and that the road is too narrow and congested to permit of additional omnibus traffic.

CAMBRIDGE.—The Watch Committee have fixed the motor omnibus fare from the centre of the town, or the railway station to the Royal Show Ground at 9d.

CHESTER.—Mr. A. R. Fearnley, general manager of Sheffield Tramways and Motor Department, has advised Chester Corporation to continue operating their tramways, and to consider the question of utilising omnibuses to act as feeders. Mr. Fearnley states that if the Tramways Committee ran a motor omnibus service to one of the outlying districts in prolongation of the tramway route they would obtain valuable experience of the feeding properties of omnibus services. The experience of other districts in regard to this matter has been that omnibus services operated in the manner suggested have had the effect of converting non-paying tramway routes into paying routes, have added enormously to the value of the undertaking, and assisted in many ways to improve the travelling facilities which tramways can offer.

DONCASTER.—The Corporation Bill to be considered by Parliament asks for powers to run omnibuses inside and outside the borough. In view of the complaints of the fares charged by motor and other hackney carriage drivers on the occasion of the races, power is sought to make by-laws fixing the fares to be paid.

DURHAM.—For five days before Christmas the Northern General Transport Company reduced their fares for omnibus journeys in the northern part of the Durham county.

GLASGOW.—The Parliamentary Committee of the Corporation have received a deputation from the Commercial Motor Users' Association against the proposal to establish municipal omnibus services in competition with private traders, inasmuch as the Corporation would be able to apply the revenue of the tramways in meeting any loss incurred on the omnibuses. The committee, nevertheless, decided to proceed with the Bill seeking omnibus running powers. Six hundred residents of Newton Mearns have petitioned Glasgow Corporation to start an omnibus service from Eastwood Toll to Newton Mearns. The question has been referred to a sub-committee.

HULL.—Reporting on the recent reduction of fares on the Stoneferry omnibus service, the general manager has stated that the change is likely to result in a loss of £1,500 for the year.

JARROW.—A Bill has been deposited to enable the Corporation to establish omnibus services in the borough.

KEIGHLEY.—The Corporation are now running three Leyland single-deck omnibuses in place of the railless trolley cars on the Oakworth route. The decision was arrived at after a trial run of motor coaches.

LANCASTER.—The Watch Committee have granted permission to Mr. W. Wilson to start an omnibus service between Lancaster and Cockerham.

LINCOLN.—Added to a loss of £1,415 for the first six months' working, the Corporation omnibuses have had a further loss of £1,900 for the past half-year. It was stated at a meeting of the Council that when the undertaking was embarked upon it was known that there was certain to be a charge on the rates. The vehicles cost £17,638.

LONDON.—Lewisham Borough Council have decided to oppose the application of the County Council to Parliament for powers to run railless trolley cars from West Norwood, via the Crystal Palace, to Lee Green. The Borough Council suggest that the London County Council should obtain powers to run motor omnibuses. A special conference of the London Labour Party will be held in January to consider the programme of the party in the County Council election in March. One point is the public ownership of omnibuses, underground railways, and steamboats.

"Model 4" Omnibus of the Associated Equipment Company, Shown at Calcutta Exhibition in December.

NATIONAL OMNIBUS COMPANY.—In their annual report the directors of the National Omnibus and Transport Company state that the services have been developed and extended. There is a profit of £26,930, which, with the amount brought forward from the previous year of £7,682, makes a total of £34,612. After transferring a sum of £15,000 to depreciation account, the directors, in view of the necessity for conserving cash resources, recommend that the balance of £19,612 should be carried forward. Mr. H. G. Burford and Mr. H. C. Merrett have been elected to the Board.

PERTH.—The Town Council have adopted the recommendation of the Tramways Committee to purchase an additional omnibus, the vehicle at present in use having frequently to carry 70 persons in place of the 32 for whom there is seating accommodation. Provided prices are sufficiently reduced, another omnibus may be bought during 1922.

SCARBOROUGH.—Messrs. Robinson's Motors, Limited, on January 2 started an omnibus service for Scarborough and district. Penny stages are given. Messrs. Seaton and Company also commenced running a service, though the tramway service remains in operation.

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MOTOR TRAFFIC

MOTOR TRAFFIC NOTES.

FOOD TRANSPORT.—Salford Health Committee recommend the Corporation to secure a by-law to ensure cleanliness of vehicles used for the transport of meat or other articles of food.

FORTY-FIVE MILE OMNIBUS RADIUS.—There are five omnibus lines running into Piedmont, U.S.A., from points within a radius of 45 miles. The fare from places 40 miles distant is 1·50 dollars per round trip.

WHERE THE OMNIBUS SCORES.—Ilfracombe Urban Council have granted a licence for an omnibus service between that town and Minehead. The journey will take three hours as against seven hours by railway with two changes.

MAILS BY LONDON OMNIBUSES. — The Postmaster-General arranged with the London General Omnibus Company for their omnibuses to co-operate in the distribution of the Christmas mails in the rural districts covered by the omnibus services.

A DAMAGED WEIGHBRIDGE.—A claim by the Glasgow Corporation against Mr. Carmichael for damage done to a public weighing machine by a motor vehicle beyond the capacity of the weighbridge has been amicably settled by a payment of £38 12s. 6d.

WORLD TOUR ON GIANT PNEUMATICS.—The Goodyear Tyre and Rubber Company (Great Britain, Limited), announce that the caravan in which Commander W. Weston is making a seven years' tour of the world is equipped with Goodyear giant pneumatic tyres.

SCALES FOR MOTOR VEHICLES.—In view of the greatly increased weight of traffic during recent years, Glasgow Corporation have asked a sub-committee to consider the whole question of the responsibility of the Corporation with regard to the maintenance of public weighing machines.

TEST OF A SIGNALLING DEVICE.—The technical department of the Royal A.C. have tested an arrow signal made by the Arrota Electrical and Motor Accessories Company, Limited, of Louth. In trials conducted on a car in the West End, both in daylight and at night, the device worked satisfactorily.

WHERE COACHES ARE WELCOMED.—The Commercial Motor Users' Association have been informed by the Ripon Corporation that they are desirous of attracting motor traffic to the city, including coaches. The association have supplied the Town Clerk with the addresses of their divisional secretaries in the north of England.

NO SPEED LIMITATION AT BURNLEY.—The Transport Ministry have refused the application of the Burnley Corporation for a speed limit for motors exceeding two tons (unladen) to seven miles an hour on part of the Manchester Road, being of opinion that any danger can be met by the provision of warning notices.

HAND WARMERS FOR DRIVERS.—In the United States electric hand warmers are placed over the inner side of the steering wheel of motor vehicles and clamped in place with a screwdriver. The current consumption is 3 amps. per hour on a 6-volt circuit. The manufacturers are the Rose Manufacturing Company, of Philadelphia.

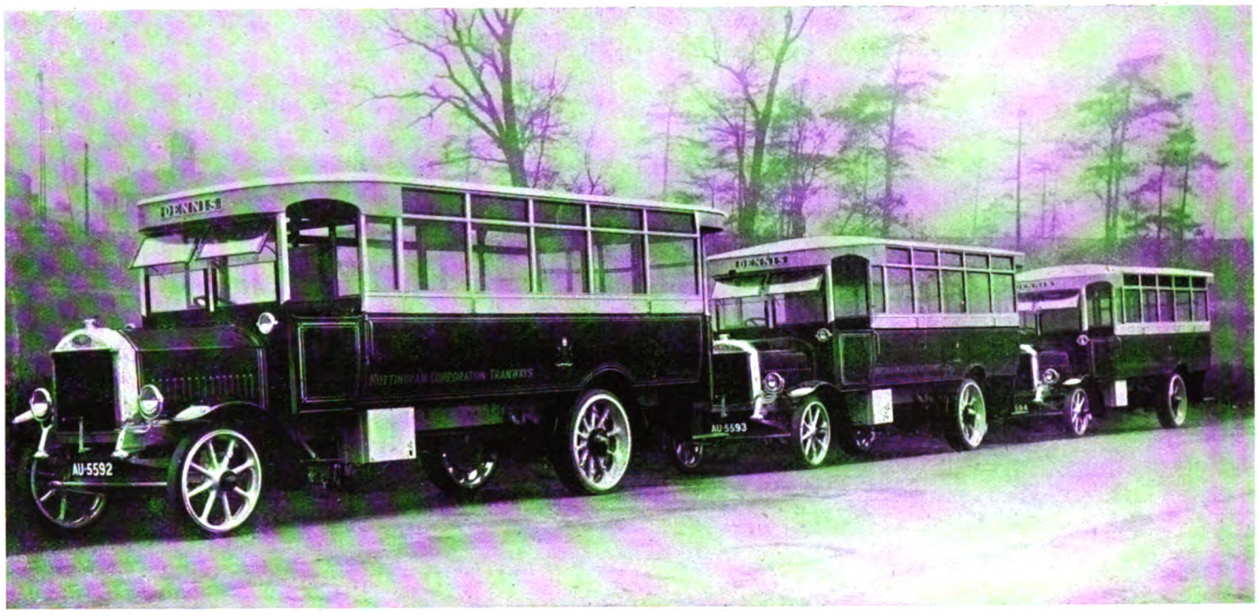
SMOKE EMISSION BY-LAW.—Glasgow Corporation have asked a sub-committee to report on a proposal to include in the Corporation next Provisional Order a clause as to the penalty of emitting smoke from mechanically-propelled vehicles, providing "that such precaution shall be taken as will prevent the emission of offensive vapours from the combustion of fuels used for power purposes or from the vapourising of oil for lubrication."

MOTOR JOURNEY LOTTERY CHARGE.—A firm of London wine merchants were fined £125 and 20 guineas costs at Bow Street Police Court for publishing a proposal or scheme for the sale of chances in a lottery. The case concerned a competition in which £2,000 was offered in prizes to purchasers of wine who most nearly estimated the distance to be covered by a motor car travelling from London to Edinburgh and Glasgow, and back to London.

CHILDREN'S FARES ON LONDON OMNIBUSES.—Beginning on January 1 the London General and Tilling Omnibus Companies introduced the following scale of reduced fares for children under 14 years of age—1d. will cover the ordinary adult 1d., 1½d., or 2d. fares. 2d. will cover the 3d. or 4d. fares. For higher fares half the ordinary fare, fractions of a penny being charged as a penny. These special rates for children do not apply to cheap midday fares.

MOTOR LORRIES REDUCE RAIL FARES.—As the railway company were charging 21s. per ton for conveying sugar from Greenock to Hamilton, the traders resorted to motor haulage at 17s. 6d. per ton. The railway company then reduced their rate to 14s. 6d. for a four-ton load, but very few merchants require so large a consignment. In order to compete with the road vehicles the local agents of the railway are asking that smaller lots should be accepted at same rate.

NO REMEDY FOR SLIPPERY ROADS.—The committee appointed by the Minister of Transport to inquire into the complaints of slipperiness of road surfaces, made arrangements with the County Councils of Worcestershire, Hampshire, and the North Riding to put down experimental sections of roads in three counties, at an estimated cost of £8,000. The Councils named contributed half of the cost, the remainder being borne by the Road Fund. Experiments in the shoeing of horses were also carried out. The committee have reported that no method of road construction or of surface treatment has been found which does not under certain climatic conditions become slippery for horses. The only immediate means of alleviating slipperiness is to incorporate grit with the tar, and to spread grit on such sections of roads as become unduly slippery. A large measure of safety for horses could be gained by improved shoeing, and by the adoption of rubber pads.



Single Deck 36-Seat 40-H.P. Omnibus built throughout by Dennis Bros. Ltd., for Nottingham Corporation Tramways.

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LONDON, JANUARY 21, 1922.

SLEEPER TRACK CONSTRUCTION.

Tramway managements who are contemplating route extensions might with advantage seriously consider sleeper construction where circumstances permit of an independent track. The subject was briefly touched upon by Mr. J. A. Brodie, the city engineer, and associate professor of engineering at Liverpool University, in the course of a recent lecture on "Street Transport in Cities." Seven years' continuous operation of the high-speed tramway service on the separate track in Edge Lane Drive, Mr. Brodie said, had shown that a speed of twenty miles an hour could be safely worked. The cheaper construction of the track laid on sleepers in grass (a description of which was given in our issue of October 8, 1914) saved about 50 per cent., both in first cost and maintenance. These results, he thought, are likely to lead to the general adoption of sleeper track wherever the necessary width of road can be secured at reasonable cost. This proviso naturally limits recourse to sleeper construction. To some extent it may be useful for single or double relief lines at suitable places, and for diversions where heavy traffic impedes tramway speed and results in excessive maintenance costs. The greatest use of sleeper track is likely to be for affording communication with new housing sites which are now absorbing large areas of land beyond existing termini. In this connection it is to be regretted that Liverpool City Council a short time ago rejected their Tramway Committee's proposal to construct a new tramway alongside the outer roads of Prince's and Sefton Parks to the Allerton housing estate. At Birmingham a line has been laid with sleepers with satisfactory results, and at Leeds also it is gratifying to observe that the Yorkshire city is benefiting both the tramways and the unemployed by using sleeper construction for the Harehills and Oakwood section of the Roundhay Road tramways, which is being diverted from the highway to an independent right of way. The distance affected is three-quarters of a mile and the road has been widened by thirty-two feet, which allows for the new track and an extra side path. At a later date the Prince's Avenue route is to be similarly dealt with, while work is now in hand on seven sections of the ring-road scheme planned years ago and ten arterial roads—a fact which testifies to the value and necessity of taking the long view of future needs.

"GAINS AND LOSSES OF MUNICIPAL TRAMWAYS."

To the Editor of THE TRAMWAY AND RAILWAY WORLD.

SIR,—I notice in your issue of January 14 you publish a statement that has been prepared by Mr. W. Allison Davies, the Borough Treasurer of Preston, showing the gains and losses of various municipal tramway undertakings for the year ended 1921-22. In the statement Birmingham is said to have been subsidised from the rates to the extent of £10,000. This is entirely incorrect; Birmingham tramways undertaking has never been subsidised from the rates and has on numerous occasion been able to assist the rates to the extent of many thousands of pounds.—Yours faithfully,

A. BAKER,
General Manager.

Birmingham Corporation Tramways,
Congreve Street.
January 17, 1922.

In a note in our last issue Smethwick tramways are mentioned as contributing £1,500 to the rates. A correspondent points out that, as our readers are probably aware, the Smethwick tramways are neither owned nor operated by the Smethwick Town Council, but are owned and operated by the Birmingham District Power and Traction Company, Ltd. This company, under an agreement, pays to the local authority the sum of £1,500 per annum, clear of all expenses, as a sort of wayleave. It is noteworthy that the Council receives from its tramways a substantial sum, whereas in many small local authorities considerable losses are being made.

SCOTTISH RAILWAYMEN'S WAGES.

The hearing of the claim of the Scottish Railways for a modification of the wages, hours and other conditions of service of their employees has been continued during the past week by the National Wages Board at the Industrial Court, Sir W. W. Mackenzie, K.C., presiding. Much important information has been elicited, and it has been clearly shown that the general eight-hour day has added seriously to the financial burden of the railways. Since the award the Glasgow and South-Western Railway, for instance, has found it necessary to make an addition of 51 per cent. to the strength of the porters' staff. Mr. J. C. Christie, chief goods manager of the North British Railway, said that on an average each employee dealing with goods traffic handled 217 tons in November, 1913, and in November, 1921, the amount had fallen to 166 tons. Mr. J. G. Barr, assistant locomotive running superintendent of the Caledonian Railway, stated that drivers' wages had increased 147 per cent., and firemen's wages 183 per cent. in that period. Since 1913 drivers' wages had risen from 36s. 4d. to 89s. 9d., and firemen who were formerly paid 23s. 1d. were now receiving 65s. 4d. The wages cost per engine mile had gone up from 2·3d. to 10·4d., an increase of 352 per cent. In reply to questions by Mr. Donald Mathieson, general manager of the Caledonian Railway Company, who appeared for the railway companies, Mr. Kiddie, a member of the Glasgow City Council, and for many years president of the Glasgow and Western Scottish branch of the National Union of Railwaymen, said he knew wages in other trades in Scotland had fallen, but he did not regard that as a reason why railwaymen's wages should be reduced. He did not know what the effect of the fall of wages had been on industry. The railwaymen's view was that before the war they were miserably paid, and they were only now reaching the standard of living they should have.

On Thursday Mr. C. T. Cramp, industrial secretary of the National Union of Railwaymen, put the case for the men. Thousands of railwaymen all over the country were, he said, watching the proceedings with anxiety. He submitted that no evidence of value in support of the companies demands had been placed before the Court. He was sceptical about the application being made in the interests of the public, and characterised the claim as exceedingly frivolous. He laid emphasis upon the undesirability of de-standardising the conditions of service at the present time; it would revive old controversies in an aggravated form. He declared that if the principle of the eight-hour day or the 48-hour week was to be taken away from the railwaymen he would not merely refuse to try to get them to accept it, but he would use all his influence to incite them to rebel against it. The eight-hour day was an institution of this country. He hoped the Board would refuse to stultify its decision of June, 1920, and would reject the claims of the companies in their entirety. The offer of the National Union of Railwaymen to meet the companies in hours of duty still stood good.

Mr. Mathieson said that the companies had no agreement with the National Union of Railwaymen in regard to an eight-hour day. Since March they had tried without success to secure a modification The Union had, in fact, spurned them. "We have made no headway in all these months." If something was not done soon the Scottish railway companies would not properly be able to fulfil their function in the economic life of Scotland. They asked to be judged by their circumstances.—The Chairman said the Board would consider its decision, and the inquiry was concluded.

Tramway Employees' Wage Reduction.—The National Joint Council of the tramway industry has notified its members that in view of the fall in the cost of living index figure for January to 92 per cent., reductions in wages will be made on and from the first full pay period in February next as follows: employees aged 18 and over, 3s. per week (making a total reduction since August last of 8s.); employees under 18 years of age, 1s. 6d. per week (total reduction since August last of 4s.).

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DEATH OF MR. EDWARD HOPKINSON, M.P.

A PIONEER OF ELECTRIC TRACTION.

Mr. Edward Hopkinson, M.P., one of the principal pioneers of electric traction in this country, and Member of Parliament for the Clayton Division of Manchester, died on Sunday last, at the age of 62. Mr. Hopkinson was educated at Owens College and Emmanuel College, Cambridge, and was also a Doctor of Science of London University. At the age of 23 he became assistant to Sir William Siemens, the eminent electrical engineer, and afterwards carried out experiments at Portrush on the first electrical tramway constructed in the United Kingdom, and designed the electrical equipment of the Bessborough and Newry tramroad. He joined the firm of Mather and Platt in 1884, and took charge of their electrical engineering department. Later, he became vice-chairman of the company.

Mr. Hopkinson will be especially remembered on account of his work in electrifying the City and South London Railway, which was opened in November, 1890. This "tube" was the pioneer of its type and its inauguration represented the largest application of electric power for traction purposes that had been made up to that time. Its equipment was noteworthy from the fact that separate locomotives were used, the armatures of whose motors were placed directly on the axles—an arrangement which, of course, dispensed with gearing. Mr. Hopkinson was awarded the Telford Premium and Stephenson Medal by the Institution of Civil Engineers for a paper in which he described the methods he had adopted. The firm with which he was connected also carried out the original electrical equipment of the Douglas and Laxey Electric Tramway and the Snaefell Mountain Railway (the latter having a continuous grade of 1 in 12 for over four miles), and of the Blackpool-Fleetwood tramway.

Mr. Hopkinson was a past president of the Institution of Mechanical Engineers, as well as of the Manchester Association of Engineers, and was on the Council of the Institution of Electrical Engineers.

MISCELLANEOUS NEWS AND NOTES.

Guernsey Tramway Fares have been reduced, and 3d. instead of 4d. is now charged for the journey between the two principal towns.

Lower Fares at Wolverhampton?—The Tramways Committee have been asked to consider whether lower fares for shorter stages would be beneficial. The present minimum fare is twopence.

Coal Output.—For the week ended January 7, the output of coal amounted to 3,674,000 tons. This compares with 3,049,000 tons in the previous week, and 4,344,500 tons in the week ended January 8, 1921.

Traffic at Charing Cross.—During the morning peak-load period motor omnibuses are now passing Charing Cross, in one direction or another, to the number of 598 per hour. In the evening rush hours the figure is 592.

Doncaster Tramway Inquiry.—The Ministry of Transport will hold an inquiry on January 31 into Doncaster Corporation's proposal to lay a tramway track along Trafford Street and Factory Lane to the existing terminus in Station Road, thus forming a loop.

British Empire Exhibition.—Work on this Exhibition was inaugurated on January 10 by the Duke of York, who cut the first sod on the site at Wembley Park. The guarantee fund has been completed. It is expected that the exhibition will be opened in the summer of 1923.

Increased Omnibus Fares at Middlesbrough.—The Ministry of Transport has authorised an increase of 100 per cent. in the omnibus fares charged by Middlesbrough Corporation, and the question of charges will be considered by a sub-committee of the Tramways Committee.

Awards to Employees for Suggestions.—During December the London Underground Companies received 247 suggestions from the staff for various improvements in services and working. For the year the total number of suggestions received was 4,149, and awards were made in 234 cases.

Special Late Tube Trains Withdrawn.—The special late trains on the London tube railways, leaving central points about 20 minutes after the last ordinary trains, were withdrawn last Saturday. The management state that the trains did not receive sufficient public support to warrant their continuance.

Dublin Tramwaymen's Position.—At a meeting of employees of the Dublin United Tramways Company held last Saturday midnight with reference to the contemplated wage reductions, it was decided to seek further negotiations with the company. The tramway service in the meantime will be maintained.

Railway Electrification in Australia.—A Reuter's message states that the Australian Minister for Railways recently said he had considered the question of converting to electric traction the railway running from Adelaide to Murray Bridge. He thought money would be well spent in obtaining a report on the cost of the project.

Glasgow Sheriff and Conductor's Duty.—At Glasgow, on January 11, a lady was awarded £10 damages in consequence of her costume having been damaged in a Corporation tramcar through a button catching in a gap between the spars of the seating. The Corporation denied liability. Evidence showed that the gap was due to the fact that the seat, which also forms the lid of a storage box, had not been pushed into its place, thus leaving a space between the spars of the lid and those of the back. The Sheriff held that it was the duty of a conductor on taking over a car to inspect it with a view to the safety of his passengers, and that this duty had not been fulfilled.

North Wales Light Railway Extension.—It is reported that the Government is now prepared to contribute to the cost of the North Wales Narrow Gauge Railway extension. The total expenditure is estimated at £85,000.

Southampton Tramway Extensions.—An extension of Southampton Corporation tramways to Millbrook has now been opened, and it is expected that the new line from Hampton Park to Swaythling will be brought into use early in February.

Reduced Fares at Pontypridd.—Pontypridd Tramways Committee have decided to recommend the Council to reduce, by means of tokens, the fares of workmen by 20 per cent. and those of ordinary passengers by 12½ per cent. The Rhondda Tramways Company wrote to the Council suggesting a mutual reduction of workmen's fares.

North Western Railway Electrification.—It is expected that a trial run will shortly be made over the recently electrified portion of the London and North Western Railway between Queen's Park and Euston. It is reported that the company are considering the electrification of the North London line between Broad Street and Poplar.

Passing Stationary Tramcars: Stoke Authority's Action.—In view of a recent street fatality at Fenton, Stoke-on-Trent Watch Committee have considered the advisability of establishing a by-law to compel motorists to pull up on approaching a stationary tramcar. The matter was referred to the Chief Constable's Consultative Committee.

Jersey Railway Electrification.—A private bill has been submitted to Jersey States Assembly, making application for powers to erect a power station on the island, to electrify the two railways, to institute a service of electric omnibuses, and to provide electric light. If the bill is passed the whole installation will be carried out free of cost to the island.

Tramway Improvement at Hull.—Hull City Council have now decided, in order to relieve the congestion at Midland Street corner, to divert the tramcars into Osborne Street. The scheme is estimated to cost £12,000. The Tramways Committee had recommended that the Hessle-Road cars be diverted, on the outward journey down Anne Street.

Swansea Tramways.—The Borough Engineer has asked the Swansea Tramways Company for a statement of the company's future policy in regard to extensions of the tramways, in order that the Highways Committee may be guided in its policy of road improvement. The adoption of the railless system is suggested and a report is to be prepared on the subject.

Influenza Epidemic and Tramway Services.—The epidemic of influenza has seriously depleted the staffs of several tramway undertakings. Over 250 outdoor employees of the London County Council system and some 300 of the Glasgow Corporation tramway staff have been off duty, with the result that certain car services in both cities were slightly affected.

Proposed New Halifax Services.—Halifax Tramways Committee have recommended the Tramways Sub-Committee to consider the purchase of another motor omnibus, with a view to starting a service for Wheatley Valley. The committee also decided to recommend the Council to approve the extension of a single line from the present Skircoat Green terminus to the top of Copley Hill.

"Speed-up" on the Piccadilly Tube.—Commencing on Monday last four additional six-car trains were put into service on the Piccadilly line of the London Underground railways during the rush hours. This means extra seats for 2,400 additional passengers. The journey from Piccadilly Circus to Hammersmith or to Finsbury Park by non-stop trains is accomplished in approximately fourteen minutes.

Leeds "Express" Tramway Route.—It is understood that the new "express" section of Leeds City tramways on the Roundhay route, between Harehills and Oakwood, may be completed by the end of February if the materials necessary for crossings and junction points are delivered promptly. The erection of the overhead equipment and the laying of the track on ballast and sleepers are now in progress.

London Night Workers and Car Services.—The London County Council have received petitions signed by some 500 night workers living in many of the South-Western districts of London, requesting an adjustment of night tramway services on the Brixton and Tooting routes. They ask for an independent night service from the Embankment on each route, and extensions of the Brixton service to Telford Avenue and the Tooting service to Merton.

Aberdeen and Stationary Tramcar Risks.—The Aberdeen magistrates, who have been considering the danger caused by vehicles passing on the near side of stationary tramcars, have given instructions that a by-law be framed requiring drivers of such vehicles to proceed at walking pace on such occasions. It is also proposed, in order still further to reduce risks, that certain tramcar stopping-places be re-arranged, leaving a clearance for other traffic.

Scottish Tramways Association.—Further steps have now been taken in the formation of the Scottish Tramways Association, to which reference was made in our issue of January 7. Following the meeting there referred to, a second conference took place last week in Dowell's Rooms, Edinburgh, when Mr. L. MacKinnon (deputy general manager, Glasgow Corporation tramways), presided in the absence of Mr. J. Dalrymple. A draft constitution was prepared, and other arrangements made for a further meeting to be held in Edinburgh. It is intended to hold periodical meetings for the reading of papers and the consideration of matter relating to Scottish tramways in general.

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Sequel to Burton Tramcar Mishap.—Alluding to the recent overturning of a Burton-on-Trent tramcar, in consequence of a broken axle, Alderman J. S. Rowland (chairman of the Tramway Committee) informed the Council that the numerous level-crossings imposed a greater strain than on most systems. Experiments were being made, and the committee were prepared to adopt the very best axle obtainable and substitute it throughout the cars, whatever the expense might be.

Omnibus Street Signs.—The Works Committee of the Marylebone Borough Council consider that the omnibus standards placed at the curb in the streets are useful, and they recommend that the London General Omnibus Company be permitted to replace them with permanent iron signs on payment of one shilling a year for each sign. The signs are placed at the stopping places of omnibuses, and bear the numbers of the routes on which the respective vehicles run.

Lower Thames Tunnel Scheme.—Sir H. P. Maybury, director general of roads at the Ministry of Transport, in a letter to Sir Alexander Richardson, M.P., expressed his sympathy with the project for a tunnel under the Thames between Gravesend and Tilbury. He considers it would be a great boon to residents in Kent and Essex, and would incidentally relieve the already considerable congestion in the South-East of London and at Woolwich Ferry.

Light Railway Extension at Newcastle.—At Newcastle-on-Tyne City Council Alderman R. Mayne (chairman of the Transport and Electricity Committee) moved that an application be made to the Light Railway Commissioners for authority to make a branch from the light railway to Westerhope down to Denton Burn, a distance of three-quarters of a mile, at a cost of £15,000. This will take the place of a tramway extension along the west turnpike from the Fox and Hounds down Denton Bank, a distance of a mile and a half, at a cost of £60,420.

London Road Scheme.—At a conference of representatives of the Surrey County Council, Kingston Corporation and adjoining districts, on January 10, a resolution was carried that it was desirable to proceed with the scheme for the construction of the proposed arterial road from Kingston Vale to Esher. The scheme provides for a road 100 ft. wide, and the estimated cost of construction, including the acquisition of land, is approximately £290,000. Colonel Brassey, chief engineer to the Ministry of Transport Roads Department, stated that half the cost would be borne by the Government.

Blackburn Tramway Extensions: Ratepayers' Poll.—In consequence of the refusal of the Blackburn ratepayers' statutory meeting to confirm clauses in the new Parliamentary Bill providing for extensions to the tramways and the running of motor omnibuses in the district, the Council have decided to take a poll of the ratepayers. The estimated expenditure on the proposed scheme amounts to £268,000. The clause relating to it was inserted in consequence of the report prepared for the Corporation by Mr. A. R. Fearnley (general manager of Sheffield Corporation tramways), which was summarised in our issue of December 17 last.

Aberdeen Tramways and Railway Competition.—The committee of the Aberdeen Town Council responsible for the promotion of a Provisional Order which includes clauses relating to tramway extensions have considered the effect upon the city of the railway companies' proposals to operate road motor services. As it is felt that these would compete unfairly with those of the Corporation, the latter is to oppose such clause in any Bill which the railways promote. The committee decided to send Councillor D. W. Beaton (convener of the Tramway Committee) and Mr. W. Forbes (general manager and engineer of the tramways) to a conference to be held in Edinburgh to consider this question.

Magistrate and L.C.C. Regulation.—When a London County Council tramcar driver was summoned at Greenwich for failing to bring his car to a standstill as soon as possible to avoid impending danger, Mr. Pattinson, who defended, explained the driver's failure to make a statement to the police after the accident by saying that L.C.C. employees were instructed not to do so. The magistrate (Mr. Disney) said this was a most improper course, as a statement made at the time was very valuable. It was going far beyond the Council's legitimate authority. Mr. Pawlyn, for the L.C.C., said the matter had been gone into very thoroughly between the Council and the Commissioner of Police. Other considerations arose beside police-court proceedings, and there was a good deal to be said for the practice adopted.

Bristol Ratepayers and Tramway Scheme.—At a statutory meeting of Bristol ratepayers held in connection with the promotion by the Corporation of a Parliamentary Bill, a resolution approving the clause relating to new tramways was defeated by a large majority. The proposal (as outlined in our issue of December 15) is that the Corporation should construct and work tramways in certain roads in Avonmouth by way of extension of the tramroad authorised by the Bristol Corporation Act, 1920, or alternatively should construct and work railless trolley vehicles on the same route and also along the new road now under construction between Hotwells and Avonmouth, in place of the tramway already authorised there. A representative of the Ratepayers' Association urged that there was no necessity for constructing either a tramway or railless system, as the Bristol Tramways and Carriage Company had offered to provide a service to Avonmouth Docks. After the resolution had been disapproved, the Town Clerk said the Council had undertaken to promote a Bill, so he supposed they would have to take a poll, which would cost from £1,500 to £2,000. At a special meeting of the City Council on Tuesday it was decided to take a poll of the ratepayers.

Snow Interferes with Tramway Services.—Over the greater part of the United Kingdom severe weather prevailed last week-end. Snow fell in many districts, including the London area, and interfered with several tramway and omnibus services in the provinces, especially in Lancashire, Yorkshire, and the Peak district. At Derby the Sunday car service had to be suspended in the evening. Throughout the day the snow plough of the Notts. and Derby Tramways Company was at work, though on this system also certain services had to be abandoned in the evening. Leeds had a similar experience and electric sweepers were employed. At Keighley men were engaged all night in salting the track and operating snow ploughs.

Proposed Bradford Tramway Reconstruction.—The tramway track renewals which Bradford Corporation hope to carry out in the next 12 months, if the necessary borrowing powers are obtained, will cost about £120,000. It is proposed to re-arrange the termini in Forster Square by altering the "island" at the Post Office side of the Square and encircling it with a line of track. This would connect with the Manningham Lane, Church Bank and Bolton Road routes and passengers' barriers would be constructed on the "island," eliminating the present pavement queues. When the existing track in Huddersfield Road, between Odsal Top and Hill Top, Low Moor, is re-laid, it is intended that the sleeper system shall be adopted.

Possible Electrification of Buxton-Manchester Line.—During the resumed enquiry by the Electricity Commissioners into the South-East Lancashire electricity scheme at Manchester on Wednesday, the Town Clerk of Buxton objected to that town being included in any electricity area, when Sir John Snell, one of the Commissioners, reminded him of the possibility that the railway line between Manchester and Buxton might be electrified—a possibility which lay, he thought, within the limits of practical politics. The Town Clerk then said if by coming into the area Buxton could in any way help towards electrifying the line from Manchester, then Buxton would be pleased to come in. Counsel for the promoters of the general scheme stated that the railway companies in the area, subject to one or two points on which a provisional arrangement had already been made, were in agreement with the scheme, which, he understood had been examined in its technical aspects by their electrical engineers.

Responsibility for Disused Tramway Track.—In the Lambeth County Court on January 10, an action was brought against Thomas Tilling, Ltd., by Mrs. Rhoda Hughes, who claimed £50 damages in respect of an accident. The plaintiff alleged that while passing the entrance to defendants' yard in East Dulwich Road her foot caught in an old tramway track running into the premises. She fell and fractured her ankle. The defendants contended that they were not neglible. The tramway was laid in 1896 by the Peckham and East Dulwich Tramways Company, whose lines were taken over by the London County Council. The tracks in the road were pulled up before the defendants took over the premises, but those running into their yard were left. The attention of the Camberwell Vestry was called to the tracks across the pavement and they decided to take no action. Judge Parry, in giving judgment for the defendants, with costs, said they had no power to abate any nuisance on the pathway. This was the duty of the London County Council, who had taken over the old tramway undertaking.

Rail Corrugation Inevitable.—The Rail Corrugation Sub-Committee (No. 1) of the Municipal Tramways Association in a final report presented some time ago give a detailed account of their experiments and observations. The result of five years' investigation is a general confirmation that there is no appreciable difference in the depth of the corrugation of rails laid in the standard manner and those of rails specially laid for experimental observation. The Committee observed the growth of corrugation over the greater part of London tramways, including a marked corrugation formed in the bottom of the groove of much worn rails on straight lines by the flanges of tramcar wheels. All observation leads to the same conclusion, viz., that corrugation of steel rails is inseparable from the action of heavily-loaded wheels rolling along the surface of the tread of rails, and that this rolling originates the corrugation by giving rise to superficial stresses in the material of the railtread which are in excess of the elastic limit and of the toughness of that material. The Committee consists of the following: Mr. W. Worby Beaumont (Chairman), Professor J. Carus-Wilson, Messrs. A. L. C. Fell, R. J. Howley, W. E. Ireland, A. H. Pott, and J. Welling.

PERSONAL.

Mr. M. B. U. Dewar, who for the past three years has been managing director of the Leeds Forge Company, Ltd., has accepted the position of managing director of the Metropolitan Carriage, Wagon and Finance Company, Ltd., of Saltley, Birmingham. Mr. Dewar will retain his seat on the board of the Leeds Forge Company.

FINANCIAL.

The Edison Swan Electric Company, Ltd., has passed the dividend on the preference shares for the half-year to January 31.

London and Suburban Traction Group.—The receipts for the week ended January 14 were £45,518 (previous week £45,872). The aggregate from January 1 to date amounts to £91,390.

London Underground Group Receipts.—The receipts of the Common Fund Companies for the week ended January 14 amounted to £212,018 (previous week £213,332). The aggregate from January 1 to date amounts to £425,350.

Fife Tramway, Light and Power Company.—The issue of £250,000 7 per cent. debenture stock at 93 was largely over-subscribed, and the list was closed the day after the prospectus appeared.

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L.C.C. Traffic Receipts.—The traffic receipts for the week ended January 18 amounted to £85,827, a decrease of £16,363 compared with the corresponding period of last year. The route length was 155·91 miles, as compared with 152·26 a year ago. From April 1 (the commencement of the financial year) to January 18 (42 weeks) the total receipts were £4,135,889, an increase of £255,034 on the corresponding period of 1921.

Tramway Traffic Receipts.—Despite increased fares tramway earnings are diminishing. The returns of thirty-four of the principal tramways in the United Kingdom for the week ended January 7 give total receipts of £357,769, or £33,087 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £183 13s. 2d. per mile of single track, and last year at the rate of £200 12s. 10d., thus showing a decrease for the week of £16 19s. 8d. per mile open.

Money and Industry.—The decision of the Government to place on sale daily from Monday next 5 per cent. Treasury Bonds, repayable in five years, at the price of 99 per cent., is a satisfactory sign of the raising of the standard of British credit. It would be unwise, however, to exaggerate the significance of the return to a 5 per cent. basis. The real cause of the rise in fixed interest-bearing stocks is the depression in trade. Lack of demand for money for trade and industrial enterprises is always reflected in a gradual lowering of the price of money. The really urgent problem lying before the country, which many seem insufficiently to realise, is the revival of trade and industry. It would be more satisfactory to see more money drawn into commercial enterprise than to note the gradual decrease in the price of money.

Chatham and District Light Railways Company.—The report for the year ended December 31, 1921, states that the revenue for the past year shows a decrease of £3,446, and the expenditure a decline of £1,228, as compared with 1920. The falling-off in net revenue is due to the coal stoppage and trade depression. The sum of £4,000 (against £6,000 last year) is placed to depreciation reserve, and a balance dividend at the rate of 4 per cent. per annum is recommended on the ordinary shares, making 4 per cent. for the year 1921, against 5 per cent. for 1920, £598 being carried forward, compared with £1,608 brought in. Traffic receipts amounted to £86,659 as against £90,080 last year, while the passengers decreased from 16,179,858 to 14,804,378. The car mileage was 974,706, and the company operates 50 cars.

CONTRACTS.

The Brush Electrical Engineering Company have an order for truck frame forgings for Glasgow Corporation tramways.

The Electric Locomotive and Foundry Company, of Gateshead, are to supply an electric storage battery locomotive to the Glasgow Corporation.

Bolton Tramways Committee have accepted the tender of Hadfields, Ltd., for special tramway rails, points and crossings, for the siding at the south end of the wholesale market.

Blackpool Electricity Committee have accepted, subject to the sanction of the Electricity Commissioners, the tender of Fraser and Chalmers (General Electric Company, Ltd.) for a 5,000 k.w. turbo-alternator.

Italian Railway Electrification.—It has been announced that the Director-General of the Italian State Railways is desirous of receiving tenders for the electrification of the Bologna-Venice-Monfalcon line, which is to be entrusted to private enterprise. Offers are to be received by April 30 next, and should be addressed to the Direzione-General Ferrovie dello Stato, Rome.

BUSINESS NOTES.

The Electro-Mechanical Brake Company have opened London offices at Donington House, Strand, London, W.C.2, with Mr. F. W. Knight as manager.

Oerlikon, Ltd.—We are informed that the business carried on by the British, Irish and Colonial department of the Ateliers de Construction Oerlikon has now been transferred to Oerlikon, Ltd., Oswaldestre House, Norfolk Street, Strand, London, W.C. The company will represent the former company exclusively in Great Britain and the Dominions, and will sell and instal electrical machinery of all descriptions.

Re-arrangement of "Underground" Finances.—Shareholders of the five principal companies which form the London Underground group met at the Caxton Hall on January 13 and considered a variation in the division between these companies of the Common Fund established under the London Electric Railway Companies Facilities Act, 1915. The Common Fund agreement provides for the payment half-yearly by the several companies of the balances of their respective revenues, after payment of their revenue liabilities, into a common fund to be divided between them in fixed percentages. The board now recommended the following variation in the percentages, and the shareholders assented :—

The City and South London Railway will continue to take 6 per cent. as before. The Central London Railway will take 16 per cent. instead of 20 per cent. The London Electric Railway will take 41 per cent. instead of 30 per cent. The Metropolitan District Railway will take 12 per cent. as before (subject to an adjustment). The London General Omnibus Company will take 25 per cent. instead of 34 per cent.

The London Safety First Council have issued two new posters, one of which makes novel use in its design of the familiar "put and take" top. The words on each side of the top are made to open a wise injunction as to how street accidents can be avoided. The other poster bears some useful advice, well illustrated, to carmen.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	Jan. 13	3,604	3,327	— 277	32¾	117,608	— 10,050
„ Motor Buses	„ 13	22	130	+ 108	32¾	8,377	+ 7,600
Ayr Corporation ..	„ 14	522	463	— 59	35	26,796	— 1,577
Barrow Corporation ..	„ 14	880	638	— 242	41	35,033	— 2,235
Belfast City	„ 13	11,074	12,255	+ 1,181	41	518,289	+ 47,934
Birkenhead Corporation	„ 15	2,683	2,494	— 189	40¾	108,384	— 12,339
„ Motor Buses	„ 15	357	487	+ 130	40¾	28,324	+ 11,059
Birmingham Corporat'n	„ 7	33,097	28,641	— 4,456	40	1,179,461	— 90,545
„ Motor Buses	„ 7	1,845	1,650	— 195	40	80,807	— 422
Blackburn Corporation	„ 11	2,395	2,132	— 263	41¾	100,136	— 8,395
Bradford Corporation..	„ 14	15,119	13,669	— 1,450	41	566,393	+ 16,206
Burnley Corporation ..	„ 14	3,438	3,187	— 251	..	..	..
Burton-on-Trent Corp.	„ 15	677	556	— 121	41	25,039	+ 714
Bury Corporation ..	„ 15	2,352	1,958	— 394	41¾	101,591	— 3,876
Chatham & District ..	„ 12	1,686	1·472	— 214	2	2,516	— 645
Chesterfield Corporat'n.	„ 9	640	559	— 81	41	24,138	— 143
„ Motor Buses	„ 9	880	644	— 236	41	31,832	— 910
Derby Corporation ..	„ 14	2,268	1,999	— 269	41	89,283	— 5,465
Dundee City	„ 11	3,202	2,849	— 353	34¾	112,051	+ 6,801
East Ham Corporation	„ 14	2,287	2,023	— 264	40¾	87,483	+ 2,396
Edinburgh Corp. Trys.	Dec. 31	..	12,069	..	33	428,098	+ 12,525
„ Motor Buses	„ 31	..	3,333	..	33	120,116	..
Glasgow Corporation ..	Jan. 14	44,476	41,318	— 3,158	32¾	1,486,201	+ 22,357
Glossop (U.E. Sup. Co.)	„ 14	237	228	— 9	2	468	— 15
Halifax Corporation ..	„ 10	4,375	3,793	— 582	39¾	178,308	+ 3,969
„ Motor Buses	„ 10	117	58	— 59	39¾	3,215	— 1,333
„ Railless Cars	„ 10	..	48	..	25	1,425	..
Huddersfield Corporatn.	„ 14	5,139	* 4,887	— 252	42	219,679	+ 10,844
Ilford U.D. Council ..	„ 14	890	1,367	+ 477	41¾	62,360	+ 8,288
Ipswich Corporation ...	„ 14	869	705	— 164	41	36,036	— 4,604
Isle of Thanet ..	„ 11	551	525	— 26	14	9,701	+ 1,182
Kilmarnock Corporat'n	„ 14	350	313	— 37	34¾	12,757	— 158
Leicester Corporation..	„ 14	6,602	6,975	+ 373	2	14,060	+ 727
Liverpool Corporation	„ 14	26,855	29,865	+ 3,010	2	60,197	+ 5,476
London County Ccl. ..	„ 18	102,190	85,827	— 16,363	42	4,135,889	+ 255,034
Maidstone Corporation	„ 12	475	435	— 40	40	19,873	— 347
Manchester Corp. ..	„ 14	38,324	36,141	— 2,183	41	1,604,319	+ 195,365
Newcastle-on-T. Corp.	„ 7	11,573	10,516	— 1,057	40	457,215	+ 14,604
Nottingham Corp. ..	„ 12	7,653	7,419	— 234	41	278,504	— 39,913
Oldham Corporation ...	„ 18	4,562	4,178	— 384	43	203,286	+ 3,848
Preston Corporation ...	„ 11	2,042	1,876	— 166	40¾	78,672	+ 4,182
Reading Corporation ...	„ 12	1,700	1,488	— 212	41	65,611	— 3,040
„ Motor Buses	„ 12	292	307	+ 15	41	14,166	+ 3,256
Rotherham Corporation	„ 9	2,696	2,284	— 412	40	90,976	— 15,818
Sheffield Corporation..	„ 15	20,344	17,714	— 2,630	41¾	808,561	— 55,601
Southampton Corp. ..	„ 11	3,233	2,867	— 366	41	121,806	— 8,028
„ Motor Buses	„ 11	310	95	— 215	41	6,518	— 3,386
Southend-on-Sea Corp.	„ 4	1,631	1,865	+ 234	40	103,362	+ 6,472
South Shields Corp. ..	„ 7	1,940	1,716	— 224	41	69,041	— 9,117
St. Helens Corporation	„ 10	2,024	1,571	— 453	41	74,124	— 11,280
Sunderland Corp. ..	„ 15	2,763	2,154	— 609	41	108,728	— 18,616
Swindon Corporation..	„ 11	385	356	— 29	40¾	16,371	+ 388
Tyneside Trys., Trds...	„ 4	802	473	— 329	1	473	— 329
Wallasey Corp. ..	„ 14	2,731	2,609	— 122	41¾	116,834	+ 8,495
„ Motor Buses	„ 14	138	215	+ 77	41¾	9,959	+ 2,772
Walsall Corporation ..	„ 14	1,975	1,480	— 495	42	68,038	— 6,327
„ Motor Buses	„ 14	1,376	854	— 522	42	38,855	— 9,017
Walthamstow U.D.C....	„ 14	1,891	1,557	— 334	41¾	85,482	+ 525
Warrington Corp. ..	„ 12	1,073	995	— 78	41	40,895	— 50
West Ham Corp. ..	„ 12	6,512	5,535	— 977	41	243,547	+ 5,839
Wolverhampton Corp.	„ 18	2,323	2,111	— 212	42	98,489	— 3,801
„ Motor Buses	„ 18	603	613	+ 10	42	27,519	+ 8,792

* Includes Motor Omnibus receipts for 1921-22.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1920-21.	1921-22.	Aggregate. Wks.	1921-22.	In. or Dec.
Anglo-Argentine ..	Jan. 14	£84,171	83,650	2	£165,292	— 4,750
Ballarat & Ben. (4 wks.)	Nov. 6	4,810	5,137	32	35,525	+ 2,525
Brazilian Traction (Mlrs)	Nov.	12,199,000	14,555,000	48	155,462,000	+ 33,156,000
Brisbane	Oct.	46,310	47,880	44	471,920	+ 12,590
British Columbia $	Nov.	858,842	877,335	22	4,252,802	+ 153,099
Buenos Aires Lacroze ..	Dec.	62,857	63,381	26	343,619	+ 7,333
Burmah Tr. & Lght. Rs.	Dec.	50,481	54,194	22	291,385	+ 32,657
Calcutta .. Rs.	Jan. 7	97,982	97,904	1	97,904	— 78
Cape Town	Dec.	29,708	31,521	..	..	..
Carthagena & Herrerias	Dec.	5,560	3,237	52	31,052	— 19,305
Cordoba	Oct.	19,627	23,203	31	162,053	+ 22,646
East India	Nov.	4,234	3,945	16	16,696	— 174
Kalgoorlie ..	Oct.	3,094	2,406	44	22,525	— 8,178
La Plata ..	Nov.	5,573	6,453	48	58,098	— 3,652
Madras (2 weeks) Rs.	Jan. 15	* 38,198	50,849	2	50,849	— 12,651
Manila .. .. $	Nov.	320,345	306,850	48	3,364,545	+ 206,755
Montevideo	Nov.	43,846	47,426	4	47,426	+ 3,580
Para	Dec.	24,253	22,660	4	22,660	— 1,593
Pernambuco	Jan. 15	4,789	3,504	2½	7,612	— 3,082
Port Elizabeth	Dec.	8,185	8,344	..	..	..
Rangoon .. Rs.	Dec.	120,000	137,750	52	1,028,551	+ 228,708
Shanghai .. $	Nov.	161,314	184,850	48	1,855,888	+ 189,000
Singapore .. $	Nov. 26	12,322	12,870	48	627,747	— 330,598
Toronto .. .. $	July	1,189,315	1,229,483	30	8,877,669	+ 642,606
Winnipeg .. $	Nov.	477,957	477,880	48	4,910,971	+ 156,466

* Strike of employees.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

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LONDON, JANUARY 28, 1922.

THE FIRST "SAFETY CAR" IN ENGLAND.

In view of our persistent advocacy of the advantages under present conditions of the one-man tramway car, it is a pleasure to comment on Mr. C. J. Spencer's introduction of a car of that type on the London United Tramways. The only matter for regret is that the trial has been delayed so long by the continuance of difficulties originated by the war. The troubles of the times, however, render the innovation only the more imperative if the company are to be given a chance to solve problems inherited from pre and post-war eras. Mr. Spencer is familiar with Mr. P. J. Pringle's experience with the one-man car in Ballarat, and he is also well acquainted with the one-man "safety car" evolved in the United States as the outcome of efforts to solve financial problems occasioned by the war. His determination to run a test car here is indeed the result of close inspection of the working of similar cars in America during the visit of several officials of the London Traffic Group in 1920. The advantages of the car have since been impressed on London tramway officers and men by means of lectures reminiscent of the tour. Its benefits are many but they may be briefly summed up. Foremost is that of the safety of passengers resulting from the entrance and exit being under the control of the driver; secondly, improved service at a low cost; and thirdly, the elimination of the conductor, whose duty is taken by the motorman with the aid of a mechanical money register. Fares are, of course, paid on entry, thus giving the first trial of this system in the London district. When the advantages of the one-man operation have been pointed out, managers in this country have often expressed apprehension of trouble with their men; but no difficulty seems to have been experienced in other countries. In the United States all workmen are eager to secure the higher pay that attends increased production resulting from the use of machinery and other improvements; and the driver of the one-man car is no exception. His union notwithstanding, the British motorman ought not to be averse from reaping the same benefit. Some at least of the conductors displaced by the introduction of the one-man car could be employed as drivers, for the number of cars would in many cases be increased. The London United car embodies some notable features. With the controller of the dead man's handle type, familiar on electric railways, the motors are brought to a stop in the event of the driver removing his hand from illness or any other cause. A special type of power-operated track brake provides easy control and thus makes it possible for the motorman to be seated in an enclosed vestibule, thus lessening fatigue and increasing his comfort. This brake is of the hydraulic type and is an invention of Mr. Spencer, who introduced it at Bradford with the object of securing safe and easy control of cars on the steep gradients encountered in some of the routes in that city. He is to be congratulated on being the pioneer in this country of what may be described as the modern one-man safety car—a very different vehicle from the "demi-car" of earlier days. The safety car, we believe, is destined to do much more than to take care of the comparatively light traffic in suburban districts. On the busier undertakings it should have a wide scope during the less busy hours.

SOUTH AFRICAN RAILWAY ELECTRIFICATION.

IMPORTANT CONTRACT FOR BRITISH FIRM.

The Metropolitan-Vickers Electrical Company, Limited, of Trafford Park, Manchester, have been successful, we are informed, in securing the first order placed in connection with the electrification of the Union of South Africa railways. The section on which work is to be started is that from Glencoe to Maritzburg on the Natal line, and the amount of the present order will be between £750,000 and £1,000,000.

It was before the war that suggestions were first made for extensive conversion to electrical operation of the South African railways. In June, 1919, Messrs. Merz & McLellan, consulting engineers, submitted a comprehensive report covering electrification schemes for: (1) Capetown to Touws River and Capetown suburban lines; (2) Glencoe-Durban and Glencoe-Vryheid East; (3) Witbank-Germiston-Randfontein and Witbank-Komatipoort. From this report it was apparent that the most pressing case was the Glencoe-Durban section, and particularly the 120 mile Glencoe-Maritzburg, as beyond Maritzburg conditions had been made easier by extensive deviations. The whole of the mineral traffic of the important Natal coalfields, for which Glencoe is a collecting centre, passes over this line on its way to the coast at Durban. For many years the mountainous stretches of country between Glencoe and Maritzburg had been a veritable bottle's neck, and the limit of steam traction possibilities had been reached.

Important economies will be effected by the introduction of electric locomotives. Assuming a loaded traffic of 20,000 tons per day in one direction on a 1 per cent. up grade, 11 electric trains (each of about 1,800 tons) would be capable of this duty, for which 14 steam trains would have to be employed. A valuable feature of electrification in these hilly districts will be the characteristic of regenerative braking on descending grades, obviating all the wear and tear on wheels and brake shoes inevitable with steam traction. This electrification will be one of the most important yet undertaken, comparing in this respect with the Chicago, Milwaukee and St. Paul railroad, the locomotives being designed to take a continuous current supply of energy at a pressure of 3,000 volts on the trolley line.

It is understood that at least 70 electric locomotives, each equipped with four motors, will be required from the Metropolitan-Vickers Company. The construction of these, and of the necessary control gear, is expected to afford considerable employment at Sheffield and Trafford Park when the work is fully in hand. That the first order placed for this important contract has been secured by a British firm in face of strenuous European and American competition, is a matter for congratulation.

GAINS AND LOSSES OF MUNICIPAL TRAMWAYS.

To the Editor of THE TRAMWAY AND RAILWAY WORLD.

SIR,—With reference to the letter from the General Manager of the Birmingham Corporation Tramways which appeared in your issue of the 21st inst., I wish to say that the particulars published in the Return accorded with the information furnished to me from official sources. I have since been advised that the £10,000 voted from the rates to the tramways undertaking of Birmingham was to provide work for the unemployed, and was not in respect of any actual or contemplated deficiency in the revenue of the undertaking.

The money, I understand, has been spent upon track renewals.

Yours faithfully,

W. ALLISON DAVIES,
Borough Treasurer.

Borough Treasurer's Office,
Town Hall, Preston.
January 26, 1922.

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ONE-MAN CAR EXPERIMENT IN LONDON.

The London United Tramways are experimenting in the Kingston district with a one-man car of their own design. It is modelled on the lines of the "safety car," so widely used and so popular throughout America. The London car has been approved by the Ministry of Transport and licensed by the Commissioner of Police. It is of the single-deck type, and when running, the whole of the car is closed in. The motorman sits in a vestibule at the front of the car and operates the controller with his left hand, while with his right hand he operates the brake. This is a track brake of the patent hydraulic type. If the driver releases his brake handle for any reason the power is cut off and the brakes are automatically applied. Passengers alight and board at the front end. The door and step move simultaneously and are operated by the motorman through a lever in the cab. The car cannot be started until the door is shut and the step folded. If the experiment proves successful, the company hope to introduce a number of similar cars with a view to giving a more frequent service on routes now served only by large cars which, during some hours, are run at comparatively infrequent intervals.

L.C.C. TRAMWAY MATTERS

RENOVATION AND OVERHAUL OF CARS.

At the meeting of the London County Council on Tuesday, it was reported that the Special Committee on Organisation of the Council's service have recommended that representations be made to the Home Secretary with a view to securing a modification of the condition as to the renovation of tramcars before annual licensing, in order to permit of the renovating and overhaul being done on a mileage basis in future. In explanation, the Committee state that a condition made by the Commissioner of Police for the Metropolis requires tramcars to be properly painted and varnished before the annual renewal of the licence. This requirement is a general one, and applies to all metropolitan stage carriages. The Committee observe that there is no similar requirement applying outside the metropolitan area. The renovation of a tramcar at the works necessitates it being laid up for at least a week for that purpose alone, and any necessary overhaul of the body, trucks, and electrical equipment is effected at the same time. The period between overhauls would, in the opinion of the Committee, be better determined by mileage run, as is the practice in the case of railways, than by the chronological period which at present governs the renovation of the paint and varnish work. It would be sufficient if the cars were overhauled and renovated on the completion of each 75,000 miles. On the basis of 120 car mile per day, this would give a period of approximately 21 months between overhauls, but as certain work, such as change of wheels, bearings, etc., at the car sheds makes it necessary for cars to be held from service, the average period between overhauls for this mileage would work out at about two years. It is estimated that the adoption of the proposed mileage basis for overhauls would effect a saving in labour alone of approximately £35,000 a year at the present time. At present the cars are laid up more frequently than is necessary, and heavy avoidable expenditure of labour and materials is being incurred. Moreover, the arrangement required by the Commissioner of Police necessitates the provision of a larger number of cars than would otherwise be required, and the Committee have been advised that the adoption of their proposal would result in an ultimate saving of at least £175,000 on capital expenditure in cars at present prices, apart from any possible ultimate saving in car shed accommodation. The requirement as to the annual renovation was not enforced during the war, and has not been strictly enforced since.

FOLDING STEP AND SIDE LIFEGUARD.

The General Purposes Committee have granted permission to Mr. W. E. Ireland, rolling stock engineer in the tramways department, to take out a patent in respect of his invention for a new type of combined folding step and side lifeguard for tramcars, subject to the condition that the Council shall be allowed to use the patent without payment of royalty should it so desire.

Lieut.-Col. Kennard, on behalf of the Highways Committee, in reply to Mr. Ammon, stated that the omnibus companies have withdrawn two of the services which connected with the Council's tramways, but the only through bookings affected are those via Euston Road, as other connecting omnibus services are available. The omnibus services in question were run experimentally, and the companies have made changes based on the results obtained.

Lieut.-Col. Kennard informed Mr. J. D. Gilbert, M.P., that a petition had been received from night workers asking for improved night car facilities in South London. The Committee had decided to run the Tooting and Brixton night car services as circular routes, so that passengers could travel direct from any point on the Embankment. This would come into operation on the night of February 1.

Mr. J. D. Gilbert, M.P., also asked the Highways Committee whether, in connection with the Council's South London tramways, the Committee had considered the provision of a service *via* St. George's Church or the Elephant and Castle to Victoria *via* the Borough Road or the Oval? Was the Committee aware of the public demand for such a service?

Lieut.-Col. Kennard replied that the officers had considered the provision of such a service, but there was no physical junction at Vauxhall, on the route via Lambeth Road, nor at the Oval, for the route via Kennington Park Road. Instructions would be given for a report to be presented to the Committee on this matter.

All tramway reports were adopted.

DUNDEE OMNIBUS DISPUTE.

COMPANY'S ACTION AGAINST CORPORATION.

In the action in which the Dundee, Broughty Ferry and District Tramways Company seek to interdict the Dundee Corporation from running a motor omnibus service to and from Broughty Ferry, the record has now been closed in the Court of Session. The plaintiffs state that in October last the Sub-Committee of the Corporation Tramways Committee, with the view of testing the amount of traffic on the route, agreed to run a motor omnibus service from the High Street to Castle Green, Broughty Ferry, with power to extend the journey to the end of the Esplanade. Plaintiffs contend that the proposed service is *ultra vires* of the defendants, and as ratepayers and as undertakers carrying on a tramway, the plaintiffs object. The route of the omnibus service extends over four miles, and it is held that part of it would be in competition with the plaintiffs' tramways, which form a junction with, and act as an extension of, the Corporation system.

The Corporation hold that the plaintiffs, as statutory tramway undertakers, have no right to complain of the omnibus service, and that the service being within the statutory powers of the Corporation—under Section 50 of the Dundee Corporation Order and Confirmation Act (1907)—an interdict should be refused. The service objected to, they urge, is experimental, and is being run solely for the purpose of testing the amount of traffic on the route.

MISCELLANEOUS NEWS AND NOTES.

Lisbon Tramway Employees' Strike.—A Reuter message of January 21 stated that Lisbon tramway employees had gone on strike.

Dover Corporation and the Railless System.—In view of the possible adoption by Dover Corporation tramways of the railless trolley car system, a deputation from the town recently inspected the York Corporation railless service.

Cairo Tramway Official Shot.—Mr. Henry Vandrehcht, traffic manager of the Cairo Tramways Company, has died from the effects of gunshot wounds inflicted by some unknown person, for whose arrest a reward of £500 is offered by the authorities.

Settlement of Dublin Tramway Dispute.—By a majority of 108 (568 against 460) the employees of the Dublin United Tramways Company have accepted the company's offer in respect of wages adjustment, and the threatened strike has thus been averted.

Tramways and Light Railways Association.—The Journal of this Association for January contains a list of Bills deposited in Parliament for the session of 1922 relating to tramways, railless traction and motor omnibuses. There is also a complete list of the members of the Association and an index for the years 1919, 1920 and 1921.

Conference on Iron Portland Cement.—The General Purposes Committee of London County Council have authorised the chief engineer to represent the Council on a sub-committee of the Conference on iron Portland Cement, convened by the British Engineering Standards Association, upon the understanding that the Council is in no way committed as to its policy.

Belfast Tramwaymen's Holidays.—At a meeting of Belfast Tramways Committee (Councillor W. G. Turner presiding), an application for extended holidays for the motormen and conductors on account of the arduous and nerve-wrecking duties they have had to perform during the past twelve months was considered. A deputation was received, and the committee decided to grant 12 instead of eight days' holiday.

Increase in Parcels' Rate at Oldham.—Manchester Corporation tramways notified the Oldham Tramways Committee that on April 3 the minimum parcels rate would be 4d. for parcels not exceeding 7 lbs. in weight, and in order to make this applicable to inter-chargeable districts in the Manchester and Salford areas, they suggested Oldham should fix a minimum rate of 6d. per parcel not exceeding 10 lbs. The suggestion was approved.

"Stentorphone" at Charing Cross Station.—A "Stentorphone" is now installed at the foot of the escalator at Charing Cross underground railway station on the Hampstead Line, where it repeats:—"Please keep moving"; "If you must stand, stand on the right," and "Some are in a hurry—don't impede them." These automatic reminders, the management state, have materially accelerated traffic on the escalator at this busy interchange point, where passengers are generally in a hurry to catch the connecting service.

New L.G.O.C. Garage at Kingston.—Early in January the London General Omnibus Company opened a new garage at Kingston-on-Thames. This town has become a terminus for country omnibus routes, and the new garage is devoted exclusively to rural traffic requirements. The services link the numerous villages in the Thames valley with Kingston, a market town, by means of regular communication with Woking, Shepperton, and Chertsey. These more convenient services attract a considerable traffic from the railways.

Proposed Tube Railway for Bombay.—The Bombay Corporation is considering a scheme for the construction of a tube railway at an approximate cost of 2½ crores of rupees (about £1,600,000), at 33 lakhs per mile, an Exchange message states. It is suggested that the work should be undertaken by one of the two railway companies serving Bombay, or by the tramways company, and, failing either of these, by the Corporation with Government assistance. Expert opinion is that no constructional difficulties need be anticipated.

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Industrial "Safety First" Association.—The report of the British Industrial "Safety First" Association, which was presented at the annual meeting held in the Caxton Hall, Westminster, stated that during the three years of its existence, the Association had clearly proved its constructive worth. During two years the extent of the decrease in accidents attained in the motor engineering and assembly industry has been 75 per cent., and that in the electrical fittings industry, 62 per cent. Mr. H. E. Blain was re-appointed hon. secretary.

Electric Vehicles Reduce Rates.—At a meeting on Thursday, the Finance Committee of the Islington Borough Council recommended a reduction of the rates by 1s. 4d. in the £. This has been made possible by, amongst other economies, the saving of 4s. a ton in the cost of refuse collection and street cleansing effected by the use of electrically operated vehicles in place of horse traction. The actual saving on these services amounts to £14,000 per annum. The fleet of vehicles now in use are Edison battery machines supplied by Electricars, Ltd., an illustrated description of which appeared in our issue of January 19.

L.C.C. and Tramway Passenger's Arrest.—When an East London merchant was charged at Old Street Police Court on Tuesday with riding on a London County Council tramway car and refusing to pay his fare, Mr. Margetts, defending, pleaded "Not Guilty," and said it was quite a new departure to give a man into custody and keep him at the police station for such a matter. Mr. Pawlyn, representing the County Council, said they had power to detain a man under the Tramway Act or the by-laws. The case for the prosecution was that the defendant, after travelling beyond the penny stage, refused to pay the excess, saying he had got on the wrong car. The magistrate said he was satisfied that there was no intention to defraud, but it was the defendant's own fault that he was in that position. He would have to pay 30s. costs.

Fog Revisits London.—London and district was again visited last Sunday by a very dense fog, which interfered considerably with street traffic. In various parts the omnibuses were forced to cease running for a time and even the tramcars which were naturally able to maintain their service somewhat better, occasionally found it necessary to stand by. At some busy junctions the traffic regulators were obliged to call out to the drivers and enquire as to what route they were on, the indicators being obscured. The speed of all vehicles was, of course, reduced to a minimum during the worst hours of the fog. Two cars collided heavily near New Cross railway station. The fore part of one was telescoped into the other, the stairs were deranged and the driver was seriously injured. A number of passengers received minor cuts from glass.

Tynemouth Tramway Company's Lease.—The Tramways Committee of Tynemouth Corporation, after a meeting with representatives of the Tynemouth and District Electric Traction Company, resolved that the company be informed that the Corporation are prepared to enter into an agreement consenting not to exercise their option to purchase the company's undertaking for a term of 21 years, subject, however, to satisfactory arrangements being made for the Corporation to exercise their rights at intervals during such period on conditions to be agreed. The committee further resolved that the agreement should provide for an improved service and the doubling of the line at various points. Mr. H. A. Stagg (one of the company's directors) stated it was estimated that the cost of doubling the track in John Street, Cullercoats, and of that length to the north situated in the Whitley district, would be from £7,000 to £8,000.

Hastings Tramway Company's Appeal.—In the King's Bench Division, on January 23, Mr. Justice McCardie considered, in the form of a special case stated by the arbitrator, a dispute between Hastings Tramways Company and Hastings Corporation. The action related to the construction to be put upon the word "cable" in the Act of 1920 concerning the construction of No. 1 tramway along the Sea Front. Counsel for the Company, who appealed against the arbitrator's decision in favour of the Corporation, said the Act threw upon the Company the obligation of connecting new lamps which they had had placed on the tramway standards with the existing main. The Corporation contended that the Company must place a new lighting cable, or an addition to the existing one, and the arbitrator upheld that view. Counsel for the Corporation said it was a condition of the withdrawal of their objection to the overhead system that they were to get a new lighting system provided at the expense of the Company. His Lordship found there was no statutory obligation on the Company to provide a main cable, but only an inter-connecting cable, and he allowed the Company's appeal, with costs.

Conduit Trouble in Washington.—Describing improved methods of handling the street railway traffic in Washington, *Electric Traction* (Chicago) makes the following reference to the difficulties of the underground conduit system:—"The entire system of electric railways in the city of Washington is of the underground conduit type, while in the suburbs overhead trolley wires supply the current. Such underground installations are desirable from the standpoint of appearance, but they are sources of continual woe to the owners. They cost roughly three times as much to build and twice as much to maintain as the other type. When there are storms the streets become almost impassable to cars because of ice and sleet fouling the slots and impeding the use of the plough. Skid chains from automobile wheels fall through and often foul the feed line, grounding the current. By keeping strict watch over the lines the service can be maintained even in bad weather."

Scottish Railway Conditions: Board's Conclusions.—The decisions of the National Wages Board on the claims made by the Scottish Railway Companies in respect of modified wages and hours of labour were issued on Wednesday. The principal findings are as follows:—(*a*) Reductions of wages under the sliding scale at the rate of 2s. instead of 1s. for every fall of five points in the cost of living until the advances given under the award of June, 1920, are absorbed; (*b*) Existing payment for night duty to be maintained; (*c*) The "adult" age of a youth is raised from 18 to 20. A new scale of wages for junior employees is fixed; (*d*) In cases where economy will accrue, men may be rostered up to nine hours a day, time worked over eight hours being paid for at overtime rates. A spread-over up to ten hours a day may be put in operation where the men can be booked off and free from duty for the period in excess of the rostered day, and where circumstances render it essential the spread-over may be extended to a maximum of 12 hours.

Scottish Tramways and Railway Group's Powers.—Opposition is growing in Scotland to the action of the West of Scotland group of railways in seeking a Provisional Order empowering them to undertake road transport services. Dundee Tramways Committee have now decided to petition against the application, and a similar attitude on the part of Aberdeen Corporation was recorded in our issue of January 21. The Dundee committee believe that if the Order were granted, other railways would apply for similar powers, and the interests of municipalities and tramway undertakings would be adversely affected. The convener (Mr. J. G. Fraser) reported the decision of the recent conference of local authorities at Edinburgh on the matter. Here it was resolved that each local authority should be recommended to petition separately against the Order, and that a committee, representing the county councils, the Convention of Royal Burghs, and the eight principal cities of Scotland, should be appointed to safeguard their interests. The Association of Municipal Corporations have decided to oppose the attempt of railway companies to secure road transport powers.

FINANCIAL.

Isle of Thanet Electric Tramways and Lighting Co., Ltd.—The directors have declared a dividend on the preference shares of 2s. 6d. per share, less income tax.

London and Suburban Traction Group.—The receipts for the week ended January 21 were £42,557 (previous week £45,518). The aggregate from January 1 to date amounts to £133,947.

London Underground Group Receipts.—The receipts of the Common Fund Companies for the week ended January 21 amounted to £199,689 (previous week £212, 018). The aggregate from January 1 to date amounts to £625,039.

Allen-Liversidge, Ltd.—A final dividend has been declared at the rate of 10 per cent., less income tax, for the six months ended October 31, 1921, making with the interim dividend paid, 10 per cent. for the year.

Anglo-Argentine Tramways Co.—The results of the working for the year 1921, as cabled from Buenos Aires, will permit of the payment of a half-year's dividend on the 5½ per cent. Cumulative Second Preference shares. This payment, amounting to 2s. 9d. per share, less income tax at 6s. in the £, will satisfy the arrears to June 30, 1917, and will be made to shareholders on the books of the company at February 7, 1922.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended January 25 amounted to £84,182, a decrease of £17,882 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year) to January 25 (43 weeks) the total receipts were £4,220,081, an increase of £237,161 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended January 14 give total receipts of £349,383, or £36,082 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £179 7s. 1d. per mile of single track, and last year at the rate of £197 17s. 6d., thus showing a decrease for the week of £18 10s. 5d. per mile open.

BUSINESS NOTES.

Tilling-Stevens Motor's Ltd., have appointed Messrs. Bristol Simplex, Ltd., engineers, of Broadmead, Bristol, as their agents for Gloucestershire and a portion of Somerset.

Sanitary Hand Strap Covers.—A Canadian correspondent inquires for British manufacturers of sanitary hand strap covers for tramway cars. Our correspondent can, of course, obtain them from makers in the United States, but is anxious to get into touch with British manufacturers.

Mr. Lionel Robinson, B.A., has taken into partnership Mr. W. E. Warrilow, A.M.I.E.E., as from January 1, and under the name of Lionel Robinson & Co., at 3, Staple Inn, London, W.C.1, they will continue and further develop the sole agency for resistance materials and wires of Henry Wiggin & Co., Ltd., Birmingham, which Mr. Lionel Robinson has held for the past fifteen years. Mr. Robinson is the originator, with Henry Wiggin & Co., of their well-known "Ferry" resistance wires, largely used in motor starters, controllers, regulators, rheostats, cinema projectors, and also in sliding resistances and many scientific instruments. Mr. Warrilow brings to the business 15 years' experience of commercial work, chiefly in encouraging, through the Press, the sales of electrical and allied products of every description.

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PERSONAL.

The death has occurred of the **Hon. Edward C. Kitson** in his 48th year. Mr. Kitson was chairman of Kitson & Co., Ltd.

Mr. J. H. Thomas, M.P., is suffering from a mild attack of influenza, and has had to cancel all engagements for the present.

It is reported that **Mr. T. W. Bloxam,** chief electrical engineer of Belfast, has resigned his position. Mr. Bloxam has been chief engineer since 1907.

Alderman S. Flint has been presented with a solid silver rose bowl by past and present members of Leicester Tramways Committee in commemoration of his twenty-one years' chairmanship of the Tramways Committee. Alderman Flint was appointed chairman in 1900, and continued to hold the office until last year. His services to the Corporation and the public have been of the greatest value, and during his chairmanship the tramways were electrified and developed from a comparatively small undertaking.

METAL PRICES.*

		Price on January 26.	Price on January 19.
COPPER.			
Best Selected	per ton	£68 10s.	£68 10s.
Electro Wirebars	per ton	£73 5s.	£73
H.C. Wire, basis	per lb.	11 1/16d.	11d.
Sheet	per lb.	12 1/8d.	10 1/8d.
PHOSPHOR BRONZE WIRE (Telephone).			
Phosphor Bronze Wire, basis ...	per lb.	1s. 2 1/8d.	1s. 3d.
BRASS 60/40.			
Rod, basis	per lb.	7 1/8d.	7 1/8d.
Sheet "	per lb.	10 3/8d.	10 3/8d.
Wire "	per lb.	10 1/8d.	10 1/8d.
PIG IRON.			
Cleveland Warrants	per ton	£4 15s.	£4 15s.
Galvanised Steel Wire, basis 8 S W G	per ton	£22	£22
LEAD PIG.			
English	per ton	£24 10s.	£25
Foreign or Colonial	per ton	£23 2s. 6d.	£23 2s. 6d.
TIN.			
Ingot	per ton	£156 5s.	£164
Wire, basis	per lb.	2s. 1 1/8d.	2s. 2 1/8d.

* Supplied by the British Insulated and Helsby Cables, Ltd.

TENDERS INVITED.

BOROUGH OF MAIDSTONE.

The Corporation invite Tenders for the supply of Uniforms for the employees of the Tramways department.

Forms of Tender may be obtained and samples inspected at the General Manager's Office, Tonbridge Road, Maidstone.

Sealed Tenders on the printed forms, endorsed "Tender for Tramway Uniforms," must be delivered to the Manager's Office on or before 11 a.m. on the 8th day of February, 1922.

The Corporation do not bind themselves to accept the lowest or any Tender.

A. T. LAMBERT,
General Manager.

POSITIONS VACANT.

BOROUGH OF ASHTON-UNDER-LYNE.

Appointment of Tramways Manager.

The Tramways Committee are prepared to receive applications from fully qualified persons for the position of Tramways General Manager.

Applicants must be thoroughly conversant with all the details of tramway work and management, and any particulars desired can be obtained on application to the Acting Manager, Tramway Offices, Mossley Road, Ashton-under-Lyne.

The successful applicant will be required to join the Officers and Servants Superannuation Scheme.

Applications, stating qualifications, experience and salary required, together with copies of not more than three recent testimonials, should be addressed to "The Chairman of the Tramways Committee, Town Hall, Ashton-under-Lyne," endorsed "General Manager," and received there not later than the first post on Saturday, February 11, 1922.

Tramway Offices,
Mossley Road, Ashton-under-Lyne.
January 24, 1922.

CITY OF HEREFORD.

Appointment of Chief Electrical Engineer.

The Corporation of Hereford invite applications for the above position.

Particulars as to duties, necessary qualifications, conditions of service, and form in which application shall be made may be obtained from the undersigned.

The salary will be £700 per annum, together with fees and commission that may amount to an additional £250 per annum.

All applications must be received on or before Saturday, February 4, 1922.

ROBERT BATTERSBY,
Town Clerk.

Town Hall, Hereford.
January 11, 1922.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	Jan. 18	3,400	3,105	— 295	33¾	120,713	— 10,344
" Motor Buses	" 18	60	127	+ 67	33¾	8,504	+ 7,667
Ayr Corporation ..	" 21	547	423	— 124	36	27,219	— 1,701
Barrow Corporation ..	" 21	862	632	— 230	42	35,065	— 2,466
Belfast City	" 20	11,307	11,726	+ 419	42	530,015	+ 48,353
Birkenhead Corporation	" 22	2,722	2,497	— 225	41¾	110,881	— 12,565
" Motor Buses	" 22	361	503	+ 142	41¾	28,827	+ 11,201
Birmingham Corporat'n	" 14	33,220	28,553	— 4,667	41	1,208,014	— 95,212
" Motor Buses	" 14	1,832	1,694	— 138	41	82,501	— 560
Blackburn Corporation	" 18	2,315	1,810	— 505	42¾	101,947	— 8,856
Bradford Corporation..	" 21	13,910	12,288	— 1,622	42	578,681	+ 14,584
Burnley Corporation ..	" 21	3,222	2,708	— 514	..	..	..
Burton-on-Trent Corp.	" 22	653	561	— 92	42	26,501	+ 622
Bury Corporation ..	" 22	2,372	2,080	— 292	42¾	103,679	— 4,169
Chatham & District ..	" 12	1,686	1,472	— 214	2	2,516	— 645
Chesterfield Corporat'n.	" 16	643	517	— 126	42	24,654	— 269
" Motor Buses	" 16	856	485	— 371	42	32,317	— 1,281
Derby Corporation ..	" 21	2,364	1,908	— 456	42	91,192	— 5,921
Dundee City ..	" 18	3,087	2,691	— 396	35¾	114,742	+ 6,405
East Ham Corporation	" 21	2,203	2,061	— 142	41¾	89,544	+ 2,254
Edinburgh Corp. Trys.	" 14	..	12,015	..	35	452,379	+ 10,465
" Motor Buses	" 14	..	3,085	..	35	127,004	..
Glasgow Corporation ..	" 21	45,428	39,338	— 6,090	33¾	1,525,539	+ 16,524
Glossop (U.E. Sup. Co.)	" 21	256	219	— 37	3	687	— 52
Halifax Corporation ..	" 17	4,205	3,439	— 766	40¾	181,747	+ 3,203
" Motor Buses	" 17	117	57	— 60	40¾	3,272	— 1,394
" Railless Cars	" 17	..	27	..	26	1,451	..
Huddersfield Corporatn.	" 21	5,261	4,638	— 623	43	224,318	+ 10,222
Ilford U.D. Council ..	" 21	* 645	1,387	+ 742	42¾	63,747	+ 9,324
Ipswich Corporation ...	" 21	811	716	— 95	42	36,756	— 4,693
Isle of Thanet ..	" 18	505	466	— 39	15	10,167	+ 1,149
Kilmarnock Corporat'n	" 21	372	304	— 68	35¾	13,061	— 226
Leicester Corporation..	" 21	6,619	6,957	+ 338	3	21,017	+ 1,123
Liverpool Corporation	" 21	26,516	27,771	+ 1,255	3	87,966	+ 6,728
London County Ccl. ..	" 25	102,064	84,182	— 17,882	43	4,220,081	+ 237,161
Maidstone Corporation	" 19	419	373	— 46	41	20,246	— 393
Manchester Corp. ..	" 21	38,171	34,433	— 3,738	42	1,638,752	+ 191,765
Newcastle-on-T. Corp.	" 14	11,349	9,529	— 1,820	41	466,744	+ 12,758
Nottingham Corp. ..	" 19	7,525	6,999	— 526	42	285,503	— 40,439
Oldham Corporation ...	" 22	4,649	4,397	— 252	44	207,683	+ 3,596
Preston Corporation ...	" 18	1,937	1,730	— 207	41¾	80,402	+ 3,974
Reading Corporation ...	" 12	1,700	1,488	— 212	41	65,611	— 3,040
" Motor Buses	" 12	292	307	+ 15	41	14,166	+ 3,256
Rotherham Corporation	" 16	2,622	2,051	— 571	41	93,026	— 16,389
Salford Corporation ..	" 22	10,625	9,409	— 1,216	40¾	453,521	+ 24,522
Sheffield Corporation..	" 22	20,569	17,719	— 2,850	42¾	826,280	— 58,451
Southampton Corp. ..	" 18	3,057	2,706	— 351	42	124,513	— 8,378
" Motor Buses	" 18	247	88	— 159	42	6,606	— 3,855
Southend-on-Sea Corp.	" 18	1,629	1,679	+ 50	42	106,807	+ 6,626
South Shields Corp. ..	" 14	1,845	1,574	— 271	42	70,615	— 9,386
St. Helens Corporation	" 17	2,039	1,491	— 548	42	75,616	— 11,827
Sunderland Corp. ..	" 22	2,824	2,146	— 678	42	110,875	— 19,294
Swindon Corporation..	" 18	362	308	— 54	41¾	16,679	+ 334
Tyneside Trys., Trds...	" 11	1,115	847	— 268	12	1,320	— 597
Wallasey Corp. ..	" 21	2,698	2,334	— 364	42¾	119,163	+ 8,131
" Motor Buses	" 21	128	168	+ 40	42¾	10,127	+ 2,804
Walsall Corporation ..	" 21	1,982	1,437	— 545	43	69,475	— 6,871
" Motor Buses	" 21	1,388	792	— 596	43	39,647	— 9,617
Walthamstow U.D.C....	" 21	1,876	1,541	— 335	42¾	87,023	+ 229
Warrington Corp. ..	" 19	1,095	980	— 115	42	41,885	— 155
West Ham Corp. ..	" 19	6,215	5,348	— 867	42	218,896	+ 4,972
Wolverhampton Corp.	" 25	2,324	2,095	— 229	43	100,584	— 4,030
" Motor Buses	" 25	616	614	— 2	43	28,133	+ 8,790

* Service stopped Sunday to Wednesday inclusive.

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1920-21.	1921-22.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..	Jan. 21	£77,716	80,745	3	£246,037	— 1,721
Ballarat & Ben. (4 wks.)	Nov. 6	4,810	5,137	32	35,525	+ 2,525
Brazilian Traction (Mrs)	Nov.	12,199,000	14,555,000	48	155,462,000	+ 33,156,000
Brisbane	Oct.	46,310	47,880	44	471,920	+ 12,590
British Columbia $	Nov.	858,842	877,335	22	4,252,802	+ 153,099
Buenos Aires Lacroze ..	Dec.	62,857	63,381	26	343,619	+ 7,333
Burmah Tr. & Lght. Rs.	Dec.	50,481	54,194	22	291,385	+ 32,657
Calcutta .. Rs.	Jan. 21	102,061	102,643	3	305,528	+ 3,309
Cape Town	Dec.	29,768	31,521	..	..	..
Carthagena & Herreries	Dec.	5,560	3,237	52	31,052	— 19,305
Cordoba	Oct.	19,627	23,203	31	162,653	+ 22,646
East India	Nov.	4,234	3,945	16	16,696	— 174
Kalgoorlie ..	Oct.	3,094	2,406	44	22,525	— 8,178
La Plata ..	Nov.	5,573	6,453	48	58,098	— 3,652
Madras (2 weeks) Rs.	Jan. 15	* 38,198	50,849	2	50,849	— 12,651
Manila .. .. $	Nov.	320,345	306,850	48	3,364,545	+ 206,755
Montevideo	Nov.	43,846	47,426	4	47,426	+ 3,580
Para	Dec.	24,253	22,660	4	22,660	— 1,593
Pernambuco	Jan. 22	4,278	3,639	3½	11,251	— 3,721
Port Elizabeth	Dec.	8,185	8,344	..	..	..
Rangoon .. Rs.	Dec.	120,000	137,750	52	1,628,551	+ 228,798
Shanghai .. $	Nov.	161,314	184,850	48	1,855,888	+ 189,000
Singapore .. $	Dec. 10	12,049	14,392	50	656,020	— 327,298
Toronto .. .. $	July	1,189,315	1,229,483	30	8,877,069	+ 642,606
Winnipeg .. $	Nov.	477,957	477,880	48	4,910,971	+ 156,466

* Strike of employees.

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(DICK, KERR SYSTEM).
Queen's House, Kingsway, London,
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THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

LONDON, FEBRUARY 4, 1922.

LONDON'S NEW CARS.

The trial run last week of one of the 125 new high-powered cars marked another step forward in the development of the London County Council's system. Members of the Highways Committee and press representatives were taken in a spick and span car, fresh from the builders' hands, from the Victoria Embankment to the central car repair shops at Charlton and thereafter to the power station at Greenwich. Everything worked smoothly and the new car's capabilities were much admired. In general appearance the new cars are similar to the familiar two-bogie, double-deck, roof-covered cars, seating 78 passengers each, with which the metropolitan public are familiar. There are, however, various improvements in detail. One of the most important changes, as compared with the existing rolling-stock, is in regard to the motors. The cars hitherto in use have had two motors of about 42 h.-p. each. Such power is ample for ordinary purposes, but it has been found that where this type of car is hauling a trailer the power available is not sufficient to give the same high acceleration after stops as is obtained when no trailer is being pulled. A result has been that where motor cars with trailers and motor cars without are on the same road, the former diminish the average speed of the latter to that which the two-car unit can accomplish. The new cars are fitted with two motors of 60 h.-p. each, and with them the object in view has been accomplished. That is to say, the new car, without a trailer, can accelerate from rest at the rate of three feet per second per second up to a speed of 12 miles per hour. This is a 50 per cent. increase in rate of acceleration as compared with the old cars. When a trailer is attached the new car can accelerate at the rate of two feet per second per second, which is the equivalent of the acceleration of the old car without a trailer. In this way, it will be seen that higher average speed, even without increasing maximum speed, will be attained on roads where two-car units and single cars are sandwiched in. The matter is of the more importance now, seeing that the Minister of Transport has sanctioned the use of trailer cars on almost all the County Council's tramway routes, instead of only on a few as hitherto. When a new car is run without a trailer it is not likely, except in emergency, that its full accelerating power after a stop will be used, as three feet per second is rather high for the comfort of passengers who have not yet got settled in their seats. For standing passengers it would be still more inconvenient. It only remains to be said of the new motors that they are more thoroughly ventilated for the purpose of keeping down heating than the old. On certain lines near Greenwich Observatory on which the overhead wire system is used, double trolley wires are employed, thus giving an insulated return, so as to prevent any possible disturbance of the delicate scientific instruments in Greenwich Observatory. Cars running on this route have thus to be fitted with two trolley poles. All the new cars are provided with two, but these are so arranged as to lessen delays at single trolley wire termini. In ordinary running on the conduit system both poles are hooked down on the roof of the upper deck. When on the single trolley wire one pole is used in the ordinary trailing fashion, and the other is hooked down at the front end of the car. On reaching a terminus all that has to be done is to pull down the pole which has been up, and to let the other one rise to its place and engage the wire. The time of swinging round a pole is thus saved, and there is at night no interval of darkness associated with the swinging. A further improvement is in the matter of steps and lifeguards. Hitherto when the driver changed ends he pulled up the step on his platform, the step rising vertically. On the new car it folds in instead, and by the same motion a side lifeguard is dropped which prevents anyone from getting in from the side through the otherwise vacant space, and so also prevents any interference with the action of the ordinary front lifeguard. Lighting and ventilation of both decks of the cars are improved. The roofs are enamelled white, and this, along with the lamp reflectors, gives a more equable diffusion of light. The ventilators have been so devised as to prevent draughts and also to exclude the rain.

NEWCASTLE TRAMWAY EMPLOYEES' HOURS.

MEN OPPOSE FORTY-EIGHT HOURS WORKING WEEK.

At Newcastle-on-Tyne Transport and Electricity Committee on January 26, Alderman R. Mayne presiding, it was decided to increase the working hours of the operating staff from 44 to 48. The Town Council, it will be remembered, on December 7 last rescinded a resolution passed by them in February, 1919, restricting the hours of their employees to 44 per week. When the Transport Committee met the representatives of the employees on Monday to inform them of the decision, and if possible, to make working arrangements, the men's representatives said they had the authority of their union to refuse to accept the new hours. Alderman Mayne gave a long explanation of the present condition of the tramway finances. The estimates for the ensuing year, which were shown to the men's representatives, proved that the Committee must have a very considerable reduction in the working costs. The public, Alderman Mayne said, justly demanded a longer service, and at present hours this would entail a considerable cost for overtime, which it was impossible to pay under existing conditions without making the tramways a charge on the rates.

Against the fact that under the National Agreement a 48-hour week is provided for, the Newcastle men argue that they enjoyed the 44-hour week before the National Agreement was arrived at, and state that a clause in that document sets out that where any better conditions prevailed, they were not to be disturbed by the Agreement. The men's delegates were informed that the Committee had decided to apply the rates common in their trade, and that would mean that the traffic staff would have to work 48 hours per week, and the men in the shops 47. It was also stated that it was intended to commence this working on February 26.

No agreement was arrived at, and the conference thus ended in a deadlock.

Derby Committee and Penny Fares.—Derby Tramways Committee have recommended that the question of adopting penny fares for short stages be deferred until after the accounts for the year ending March 31 next have been made up.

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LONDON OMNIBUS REFITTING WORKS.

Representatives of the technical and general press have recently had the opportunity of visiting the new overhaul works of the London General Omnibus Company and of examining the splendid equipment and organisation of the factory. There are now about 2,800 omnibuses in the company's fleet, and the overhaul of all these vehicles will be carried out at the new works, which take the place of a number of small repair shops which were scattered over London. The Chiswick works occupy an area of some 300,000 square feet, while the entire site covers about 31 acres. The buildings are equipped with the latest types of machines, many of which have been specially designed for the work. At full load the factory can thoroughly renovate 120 omnibuses a week, and it is at present dealing with half this number. In both the engineering and coach-building departments the most elaborate arrangements have been made to secure expedition and economy, and it is safe to say that there is nothing to equal the Chiswick works. London has always led in omnibus services, and it is gratifying to know that the London General Omnibus Company has now taken another great step forward in its provision for maintaining the enormous traffic with which it has daily to cope. The extent of the problem with which it is faced is but imperfectly appreciated even by those who have a general acquaintance with its services. Over 1,000 million passengers are carried annually, and its vehicles travel 100 million miles. The high standard maintained in its inspection and repair work is proved by the fact that a loss of only three miles in 10,000 is attributable to failures in service. To maintain such a record the very best facilities are necessary, and the company's engineers have provided every possible advantage at the new shops. A tour of the various departments shows much that is novel and arresting, and a volume would be necessary to describe the machines in detail and the admirable arrangements and organisation that characterise the factory. The results obtained indicate the extent of the success that the designers of the undertaking have achieved. Before the factory was in operation, sixteen days was the minimum period necessary for the overhaul of an omnibus. In the new works the operation will be completed in four days. That is, vehicles are to be returned to service four times as quickly as before, and a clear gain is obtained of twelve working days per vehicle per annum.

In welcoming press representatives at a luncheon at the Victoria Hotel on Tuesday, Mr. G. J. Shave expressed regret that Lord Ashfield was unable to be present, and gave an interesting account of the part that the Chiswick works will play in maintaining the company's services. The works had cost about £500,000, but the result would be well worth the expenditure. They had secured mass production of repairs which had never been attempted before in any part of the world. As complete interchangeability was maintained in the repair works as it was in a factory producing new vehicles. The development of the Chiswick works would lead to enhanced efficiency in the service and greater economy. After luncheon the party were taken by omnibuses to the works, and were received by Mr. G. J. Shave, chief engineer and manager; Mr. C. Leese, engineer-in-charge; Mr. O. W. J. Watson, experimental and research engineer; Mr. S. Gage, coach factory superintendent; Mr. G. Rushton, production engineer; and other officers.

THE NEW L.C.C. CARS.

Of the 125 new London County Council tramway cars which are now being delivered, about a dozen were on hand at the time of the formal inspection last week, to which reference is made else where in this issue. Out of the total, 75 car bodies are being built by the Brush Electrical Engineering Co., Loughborough, and 50 by Hurst, Nelson & Company, Motherwell. The electrical equipment is, in regard to 75, by the English Electric Co., and as regards 50 by the Metropolitan-Vickers Electrical Co.

Mr. A. L. C. Fell, general manager of the tramways, who accompanied the inspection party, pointed out that the aim of the management was to obtain greater speed. He also commented on the efficient lighting and said he had been able to read a newspaper at night in every part of one of the new cars. The inspecting party were shown over the Greenwich power station, where the last of the reciprocating engines superseded by turbines is now being dismantled, and the Charlton central repair shops, where an extension is under construction.

L.C.C. TRAMWAY MATTERS

LONDON UNITED TRAMWAYS, LTD.—PURCHASE OF LINES.

Several tramway matters occupied the attention of the London County Council at its meeting on Tuesday, and the various reports were adopted.

Under an agreement of December 6, 1917, with the London United Tramways, Ltd., the Council has to complete the purchase of that portion of the company's undertaking in Hammersmith on or before 12 months from the termination of the war, or at such earlier date within that period of 12 months as the Council may, on giving the company not less than three months' previous notice, require. The chief provisions of the agreement are as follows:

(i) Payment by the Council of the purchase money of £235,000 in respect of the Company's lines in Hammersmith, the Chiswick power station, depot, and certain fixed plant, furniture, implements, etc., and a sum of £1,000 deposited with the Hammersmith Metropolitan Borough Council, and 45 cars.

(ii) The company to be at liberty to convert a part of the generating station into a transforming station, and to use the same for a period not exceeding 21 years, the company providing free of cost during that period a sufficient supply of direct current for the tramways up to 1,800,000 units a year, the Council paying for any excess at a rate to be agreed or determined by arbitration.

(iii) If the Council gives the company notice at the same time as it gives notice requiring completion, the Council may require the company to work the lines purchased exclusively for such time and on such terms and conditions as the parties agree, the company handing over to the Council gross receipts less working expenses, and a reasonable sum for establishment charges, and the Council lending the company the 45 cars.

(iv) If the company are not required to work the lines purchased exclusively, the Council is at liberty to run over the company's lines in Middlesex jointly with the company, and the company are at liberty to run over the lines purchased jointly with the Council, the mileage being equal, and each party accounting for gross receipts taken, the other terms and conditions being agreed or determined by arbitration.

(v) Each party to have the right to fix and alter fares on its own tramways.

(vi) The company to be allowed access to the transforming station, and the Council to be allowed access to the depot.

The Highways Committee recommended that the purchase should be completed on May 2, 1922, and that the company should be given notice accordingly. As payment will not be made until the next financial year, it is proposed to make provision for it in the capital estimates of 1922-23.

THE TRAMWAYS DEBT.

The Finance Committee reported that the aggregate net debt of London on March 31, 1920, amounted to £98,367,863, or a decrease during the year of £411,380. The net debt attributable to the tramways is £8,086,570, or a decrease of £263,248.

REDUCTION IN WAGES.

The Highways Committee stated that in accordance with the terms of the agreement of June 16, 1921, of the National Joint Industrial Council for the tramways industry, a further reduction of 3s. a week in the wages of tramway employees is to take effect as from the first full pay period in February. As a result of this, it is estimated that a saving of about £14,800 will be effected during the current financial year, and £93,000 for the full year.

WOMEN EMPLOYEES AT THE CENTRAL REPAIR DEPOT.

Having regard to the fall in the cost of living, the Highways Committee considered that some reduction should be made in the wages paid to the women employees at the central repair depot. The Chairman of the Council, acting under standing orders, decided on behalf of the Council during the Christmas recess that the rates of pay of women of 18 years of age and over should be reduced as from January 5 to 35s. 6d. a week, and that the existing rates of girls between 14 and 18 years of age should be reduced proportionately, that is, 2s. 3d. in the £.

THROUGH BOOKINGS BETWEEN OMNIBUSES AND TRAMWAYS.

In February, 1921, the Council decided to enter into an agreement with the London General Omnibus Company for the provision of omnibus services to and from the London tramway termini and for through bookings between omnibuses and tramways. In consequence of the reduction of fares which came into operation on December 1 certain modifications were necessary as regards the through bookings, and it had now been agreed that the following arrangements should be put into force on February 1 as regards through bookings: (i) The through bookings covering 1½d. omnibus stages to be withdrawn; (ii) the Company to receive or retain ¾d. for a 1d. stage on the omnibus; (iii) the Council to add one section to the ordinary 1d., 2d., 3d., etc., tramway stages in respect of which the Council will receive or retain 1¼d., 2¼d., 3¼d., etc. Negotiations are being continued in reference to through bookings between Charing Cross Embankment and Euston Road terminus.

TRAILING WHEEL TYRES.

Seventeen tenders were received for the supply of 1,000 and alternatively 2,000 trailing wheel tyres. The two lowest tenders were not to specification, and the Highways Committee accepted the next lowest, *viz.*, that of Steel, Peech & Tozer, Ltd., for the supply of 2,000 tyres at £1 16s. each.

MISCELLANEOUS NEWS AND NOTES.

"Keep to the Left" Rule at Brighton.—Brighton has adopted the "keep to the left" rule of the footpath.

Foreign Tenders Excluded.—The London County Council has decided for the time being to restrict invitations to tender for electric lamps to British firms.

Princes Street, Edinburgh: Scheme Confirmed.—Edinburgh Town Council have re-affirmed, by 36 votes to 20, their decision to use centre poles in Princes Street.

Omnibuses for Burnley.—Burnley Corporation Tramways Committee have asked a sub-committee to report as to the desirability of instituting motor omnibus services in the borough.

Loan for Omnibus Purchase at Hull.—The Transport Ministry have sanctioned a loan by the Hull Corporation of £10,000 for the purchase of motor omnibuses, the repayment period being fixed at six years.

Penny Fares on Birmingham Tramways will be introduced on Monday next. No alterations are to be made in the stages and fares now in force, but each route is divided up into a number of penny stages, in a few cases overlapping.

Cost of Hull Omnibus Service.—The six months' working of the Stoneferry omnibus service of the Hull Corporation shows a loss of £413. The costs are particularly low, averaging about 16d. per omnibus mile, due to the fact that the omnibuses are new and no new buildings had to be fitted up.

End of the Transport Ministry?—*Modern Transport* says that it is enabled, on the highest authority, to state that the Geddes Committee have recommended that the Transport Ministry should finally lose its identity as a distinctive Ministry, and that such of its functions as may be deemed desirable or necessary in the light of existing circumstances should be discharged by other and pre-war departments.

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Omnibuses for Blackpool.—As the Corporation have rejected the proposal for municipal omnibus services, the Blackpool Tramways Committee now suggest that licences should be granted for private services to those who will agree to terminate such services at the end of three years without compensation.

Montevideo Tramway Strike Sequel.—After a strike on the company-owned electric tramways of Montevideo had lasted 21 days, the Municipal Council took possession of the companies' property, having decided to pay the men the increased wages they demanded. The companies had protested their inability to concede the increases unless fares were advanced. The managers will temporarily retain their posts, pending instructions from their boards in London and Barcelona.

Strike of Sunderland Tramway Company's Employees.—The employees of the Sunderland District Electric Tramways, Ltd., struck work on Thursday because the company sought to make a wage reduction higher than that of 3s., which is now due under the National Agreement. The company, in view of the serious decrease in revenue, contended that it is unable to continue to pay the present wage bill, and sought a maximum reduction of 10s. a week in the case of the higher paid men.

Tramway Extensions at Sheffield.—As part of a large scheme for relieving the unemployed, Sheffield City Council have decided to extend the Ecclesall tramway route to Millhouses Lane and to double the track on the Intake route. The former scheme, which will cost £17,000, has already been started, and work on the Intake route will shortly be put in hand. The length of route to be doubled is about one mile, and at the same time the old rails will be replaced. The estimated cost of the Intake project is £31,000.

Result of the Blackburn Tramway Poll.—The poll of Blackburn ratepayers on the question whether a clause should be included in the Corporation Parliamentary Bill providing for tramway extensions and the inauguration of omnibus services resulted as follows: For the proposal, 2,354; against, 8,639; majority against, 6,285. Only 20 per cent. of the electorate voted. The clause in dispute, as stated in our issue of January 21, would have involved an expenditure of £268,000. It will now, of course, be dropped.

Bristol Pedestrians to "Keep To The Left."—Bristol Watch Committee as already noted, has directed pedestrians to keep to the left on the pavements of the city. In a statement by Sir J. Swaish, chairman of the committee, the fact was noted that many serious accidents occur through pedestrians stepping from the kerb into the roadway without noticing some rapidly overtaking and almost silent motor or other vehicles. In passing from the left of the pavement the pedestrian will have full opportunity of noticing oncoming vehicles.

Progress of Edinburgh Electrification.—The Tramways Committee have decided to proceed with the electrification of certain sections of route No. 3, Princes Street, Gorgie, Braid Hills, Craiglockhart and Murrayfield, and have remitted to a special meeting of the committee the question of the electrification of the northern routes in order that as early as possible the motor omnibuses may be withdrawn. A letter was read from the Automobile Association stating that they will oppose the application to the Transport Ministry for authority to erect centre poles in Princes Street, in view of the danger to other traffic which, the Association allege, has been caused in other towns by similar standards.

Bristol Ratepayers Defeat Tramway Scheme.—By means of a poll on Tuesday Bristol ratepayers decided against the proposed tramways along the Low Level Road to Avonmouth. The voting was as follows:—For the Bill, 13,241; against, 19,756; majority against, 6,515. The clause which was to have been inserted in the Corporation Bill sought to authorise the provision of tramways along Avonmouth Road, Richmond Road and Terrace, St. Andrew's Road, and Gloucester Road, Avonmouth, as an extension of the tramroad already authorised to be provided on the Avonmouth Low Level Road. Further alternative powers were sought to provide railless traction in the above-mentioned roads instead of the authorised tramroad and the proposed tramways.

Irish Motor Exhibition.—Irish motor traders and the Royal Irish Automobile Club have agreed to collaborate in holding an international motor exhibition in Dublin during February, 1923. The Society of Motor Manufacturers and Traders has agreed in principle to support the Irish motor show, and will co-operate to make it a success, provided that the new Irish Government raises no obstacles to trade in British cars. As representatives for Great Britain and Ireland of the International Bureau of Chassis Constructors, the Society of Motor Manufacturers is charged with the regulation of international events in these countries; and the co-operation of the Society with the Irish authorities is requisite to ensure that the motor exhibition in Dublin next year be recognised internationally.

Mayor of Gloucester and Tramway Critics.—On the occasion of the annual dinner of the Gloucester employees of Bristol Tramways and Carriage Company last week, the toast of the Company was proposed by the City High Sheriff, who congratulated the firm on the business-like way in which their operations were carried on in Gloucester. He also spoke very highly of the courtesy and efficiency of the local manager, Mr. H. J. Balchin (who presided). Col. S. E. Smith, C.B.E. (general manager of the company), responded, and said the High Sheriff's remarks were deeply appreciated. The Mayor (Councillor J. O. Roberts) remarked that he was not one of those who said "Scrap the trams," and he knew that the people who made this request would, if the tramcars were scrapped, be the first to complain.

Road Transport Workers' Wages.—At a conference in London on Wednesday between the National Transport Workers' Federation and the Commercial Road Transport Association, a proposal by the employers for a reduction of 3s. per week for all grades of road transport workers was discussed. This was rejected by the men and a deadlock arose.

Taunton's Transport Problem.—A report was published last Saturday by the Mayor of Taunton, of the resumed negotiations between the Corporation and the Taunton Electric Traction Company in connection with the suggested purchase of the tramway undertaking, which ceased operation last May. From this it appears that the Special Tramways Committee of the Council disapproved of the proposed purchase and that the Council adopted their recommendation by 12 votes to seven. It is understood that the Tramway Committee's decision arose from financial considerations as the tramways had not made any return upon capital for many years. The committee recommended that steps be taken to endeavour to provide a flexible service of motor omnibuses for the borough by private enterprise. Arrangements will now be made for the removal of the tramway track and overhead equipment by the company. The roadway over a route length of nearly two miles will require to be reinstated.

Black Country Tramways Bill.—Among the Bills which have been deposited for introduction in the next Parliamentary session is one promoted jointly by the Birmingham District Power and Traction Company, Dudley, Stourbridge and District Electric Traction Company, South Staffordshire Tramways Company, South Staffordshire Tramways (Lessee) Company, and the Wolverhampton District Tramways. The large system of tramways in the Black Country which these five companies own or lease are situated within the districts of a large number of local authorities, who are authorised to purchase compulsorily portions of the undertakings at various dates from 1922 to 1938, and at recurring intervals of seven years. The Bill now proposes to synchronise these dates and to postpone the first date of possible purchase by any one authority to within six months after September 29, 1950. From the passing of this Bill there would be incorporated "The Birmingham and Midland Tramways Joint Committee," for the purpose of managing the undertakings of the five companies.

PERSONAL.

Mr. H. C. Day has been appointed electrical engineer and tramway manager of Heywood Corporation. Mr. Day was selected from 67 applicants. He succeeds Mr. D. H. Davies, who recently accepted the position of assistant general manager of Chesterfield Corporation tramways.

The late **Mr. R. Baron,** who was motor school superintendent in the tramways department of the London County Council, and who died in December last, was referred to by the Highways Committee as a capable and zealous officer. He entered the employment of the Council in 1905.

Mr. William Murray.—At a well-attended social function of the Walthamstow Branch of the N.A.L.G.O., held in the Tramways Recreation Hall on January 27, Mr. William Murray (manager of the Walthamstow Council Tramways), who is the chairman of the Branch, was the recipient of a handsome easy chair, the gift of the members of the Branch. It was intended as a mark of esteem and appreciation of the valuable services rendered by him on their behalf during the three years he has been chairman of the Branch, and also as leader of the officials' side of the Local Joint Staffs Committee. Mrs. Murray was presented with a silver cake basket.

FINANCIAL.

Montreal Tramways Company.—A dividend of 2½ per cent. on account of accumulations has been declared. Arrears of 2½ per cent. still remain to be paid off.

London and Suburban Traction Group.—The receipts for the week ended January 28 were £41,757 (previous week £42,557). The aggregate from January 1 to date amounts to £175,704.

London Underground Group Receipts.—The receipts of the Common Fund Companies for the week ended January 28 amounted to £192,358 (previous week £199,689). The aggregate from January 1 to date amounts to £817,397.

Stalybridge, Hyde, Mossley, and Dukinfield Tramways and Electricity Board have decided to levy precepts of £500 on each of the four constituent authorities to cover the loss on the tramways undertaking, estimated at £2,000.

Lanarkshire Tramways Co., Ltd.—The directors have decided to recommend a dividend of 6½ per cent. for the past half-year, making, with the interim dividend of 5 per cent. paid to June 1, a dividend of 5¾ per cent. for the half-year.

The Metropolitan Railway Company have declared a dividend at the rate of 3¼ per cent. per annum, making 2¼ per cent. for the year, against 1½ for preceding year. £50,000 is placed to reserve, and the balance carried forward is £17,800. Distribution on surplus land stock 1½ per cent. for the latter half of 1921, making 3 per cent. for the year, against 2⅞ per cent.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended January 21 give total receipts of £332,311, or £45,697 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £170 11s. 9d. per mile of single track, and last year at the rate of £194 0s. 11d., thus showing a decrease for the week of £23 9s. 2d. per mile open.

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City of Buenos Aires Tramways Co. (1904).—A balance dividend of 1s. 3d. per share, making 5 per cent., less tax, for the year 1921, has been declared; £2,000 has been transferred to general amortisation fund (against £3,000 last year), and £7,339 is carried forward, against £3,940 brought in.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended February 1 amounted to £92,040, a decrease of £9,366 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year) to February 1 (44 weeks) the total receipts were £4,312,136, an increase of £227,810 on the corresponding period of 1921.

Hull Tramways Estimates.—Mr. E. S. Rayner, general manager of Hull Corporation tramways, estimates that the undertaking will show a surplus of £554 at the end of the current financial year, in spite of a decrease in revenue of £25,602. He also expects a deficit on the Stoneferry omnibus service (which has been running for six months), of £413. Mr. Rayner estimates that the result of the coming year's operation of the tramways will be a surplus of £11,800.

Hong-Kong Tramway Company have announced that they propose to assign the whole of the undertaking to a new company, to be incorporated under the Hong-Kong Companies' Ordinance, in exchange for shares of that company. The capital of the new company will be 325,000 shares of the nominal value of $5 each, treated as fully paid up. All these shares will be issued to this company. The board are convinced that this act is in the best interests of the company, to reduce the future liability of the company for corporation profits tax, and to a great extent eliminate the differences in exchange which occur each year.

CONTRACTS

Rotherham Corporation have adopted the Straker-Clough trolley omnibus chassis, and an order has been placed with Clough, Smith and Company, Ltd., the sole agents for this vehicle.

The Tees-side Railless Traction Board have placed a further order for four trolley omnibuses with Clough, Smith and Company, Ltd. This order is the result of the successful operation of a trial vehicle recently supplied.

Clough, Smith and Company, Ltd., of 36, Victoria Street, London, S.W., have secured from the Bloemfontein municipality their latest order for five trolley omnibuses, which will be of the "Straker-Clough" standard design.

The Woods-Gilbert Rail Remodelling Company, Ltd., of 170, Strand, London, W.C., have received a renewal of their contract with the London County Council for lip cutting and grooving of rails for a further period of twelve months. The company have also entered into a contract with the Exeter Corporation to remove corrugations from the rails.

London County Council Stores.—The Stores and Contracts Committee of the London County Council, in their report for the three months ended December 31, 1921, mention the following:—Electric lamps (14 firms invited to tender) English Electric and Siemens Supplies, Ltd., estimated value, £7,250; uniform clothing for tramways department (21 firms invited to tender), John Hammond and Co., Ltd., estimated value, £5,766; steel castings for tramways department (permanent way, etc.) (29 firms invited to tender), A.T. Green and Sons, Ltd., estimated value, £6,060.

TENDERS INVITED.

CITY OF CARDIFF.

Steel Tramway Rails.

Tenders are invited for the manufacture, supply and delivery of 400 tons of Steel Tramway Rails (British Standard Section No. 4 revised).

Forms of Tender and Specification may be obtained, and Conditions of Contract seen, at the office of the City Engineer, City Hall, Cardiff.

Sealed Tenders on the prescribed forms endorsed "Tender for Tramway Rails," are to be delivered at the Town Clerk's Office, City Hall, Cardiff, not later than Wednesday, February 15, 1922.

CECIL G. BROWN,
Town Clerk.

POSITIONS VACANT.

ASSISTANT ENGINEERS FOR SMALL TRAMWAY, LIGHTING AND POWER COMPANY IN BRAZIL.

Applications are invited for the following positions:—

1. First Assistant Engineer. Salary £550 per annum. Must have had experience in general Tramway maintenance, including Track, Rolling Stock and Overhead Equipment.

2. Second Assistant Engineer. Salary £450 per annum. Must have had experience in the distribution side of an Electric Light and Power Undertaking, and also in Power Station work.

Passage to Brazil paid.

Applicants should send age, details of experience and copies of two recent testimonials to Box No. 23, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

February 1, 1922.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	Jan. 25	3,435	2,980	— 455	34½	123,692	— 10,800
„ Motor Buses	„ 25	59	123	+ 64	34½	8,627	+ 7,731
Ayr Corporation ..	„ 28	553	423	— 130	37	27,643	— 1,830
Barrow Corporation ..	„ 28	900	679	— 221	43	36,345	— 2,687
Belfast City	„ 27	11,909	11,921	+ 612	43	541,936	+ 48,965
Birkenhead Corporation	„ 29	2,710	2,401	— 309	42½	113,282	— 12,874
„ Motor Buses	„ 29	392	473	+ 81	42½	29,301	+ 11,283
Birmingham Corporat'n	„ 21	33,194	27,422	— 5,772	42	1,235,437	— 100,984
„ Motor Buses	„ 21	1,879	1,596	— 283	42	84,098	— 843
Blackburn Corporation	„ 25	2,512	2,047	— 465	43½	103,994	— 9,330
Bradford Corporation..	„ 28	14,279	12,674	— 1,605	43	591,355	+ 12,979
Burnley Corporation ..	„ 28	3,436	3,088	— 348	..	..	..
Burton-on-Trent Corp.	„ 29	660	582	— 78	43	27,083	+ 544
Bury Corporation ..	„ 29	2,478	2,120	— 358	43½	105,799	— 4,527
Chatham & District ..	„ 28	1,629	1,374	— 255	4	5,252	— 1,161
Chesterfield Corporat'n.	„ 23	660	548	— 112	43	25,202	— 381
„ Motor Buses	„ 23	932	522	— 410	43	32,839	— 1,691
Derby Corporation ..	„ 28	2,371	1,985	— 386	43	93,177	— 6,307
Dundee City ..	„ 25	3,210	2,812	— 398	36½	117,555	+ 6,007
East Ham Corporation	„ 28	2,203	2,076	— 127	43½	91,620	+ 2,126
Edinburgh Corp. Trys.	„ 21	..	9,576	..	36	461,955	+ 8,131
„ Motor Buses	„ 21	..	2,712	..	36	129,715	..
Glasgow Corporation ..	„ 28	46,453	41,458	— 4,995	34½	1,566,998	+ 12,139
Glossop (U.E. Sup. Co.)	„ 28	244	251	— 7	4	938	— 45
Halifax Corporation ..	„ 24	4,380	3,615	— 765	41½	185,362	+ 2,438
„ Motor Buses	„ 24	117	57	— 60	41½	3,329	— 1,454
„ Railless Cars	„ 24	..	41	..	27	1,492	..
Huddersfield Corporatn.	„ 28	5,256	4,657	— 599	44	228,976	+ 9,623
Ilford U.D. Council ..	„ 28	1,321	1,370	+ 49	43½	65,117	+ 9,373
Ipswich Corporation ...	„ 28	831	704	— 127	43	37,460	— 4,823
Isle of Thanet ..	„ 18	505	466	— 39	15	10,167	+ 1,143
Kilmarnock Corporat'n	„ 28	383	300	— 83	36½	13,361	— 310
Leicester Corporation..	„ 28	6,508	7,307	+ 799	4	28,325	+ 1,921
Liverpool Corporation	„ 28	27,015	28,085	+ 1,070	4	116,053	+ 7,801
London County Ccl. ..	Feb. 1	101,406	92,040	— 9,366	44	4,312,136	+ 227,810
Maidstone Corporation	Jan. 26	410	361	— 49	42	20,607	— 442
Manchester Corp. ..	„ 28	38,696	35,903	— 2,793	43	1,485,776	+ 188,879
Newcastle-on-T. Corp.	„ 21	11,155	8,254	— 2,901	42	474,997	+ 9,831
Nottingham Corp. ..	„ 26	7,678	6,998	— 680	43	292,502	— 41,118
Oldham Corporation ...	„ 29	4,634	4,308	— 326	45	211,991	+ 3,271
Preston Corporation ...	„ 25	1,939	1,717	— 222	42½	82,119	+ 3,752
Reading Corporation ...	„ 26	1,594	1,397	— 197	43	68,401	— 3,391
„ Motor Buses	„ 26	259	255	— 4	43	14,701	+ 3,270
Rotherham Corporation	„ 30	2,829	2,228	— 601	43	97,493	— 17,530
Salford Corporation ..	„ 29	10,858	9,878	— 980	42½	463,398	+ 22,654
Sheffield Corporation..	„ 29	20,861	17,833	— 3,028	43½	844,113	— 61,480
Southampton Corp. ..	„ 25	3,103	2,836	— 267	43	127,349	— 8,645
„ Motor Buses	„ 25	210	95	— 115	43	6,702	— 3,970
Southend-on-Sea Corp.	„ 25	1,630	1,696	+ 66	43	108,503	+ 6,693
South Shields Corp. ..	„ 21	1,902	1,503	— 399	43	72,118	— 9,789
St. Helens Corporation	„ 31	2,166	1,574	— 592	43	77,190	— 12,419
Sunderland Corp. ..	„ 29	2,830	2,203	— 627	43	113,078	— 19,921
Swindon Corporation..	„ 25	359	310	— 49	42½	16,989	+ 284
Tyneside Trys., Trds...	„ 18	1,118	698	— 420	3	2,018	— 1,018
Wallasey Corp. ..	„ 28	2,690	2,340	— 350	43½	121,507	+ 7,780
„ Motor Buses	„ 28	133	200	+ 67	43½	10,327	+ 2,856
Walsall Corporation ..	„ 28	1,997	1,481	— 516	44	70,956	— 7,387
„ Motor Buses	„ 28	1,420	847	— 573	44	40,494	— 10,094
Walthamstow U.D.C....	„ 28	1,914	1,538	— 376	43½	88,697	— 135
Warrington Corp. ..	„ 26	1,090	981	— 109	43	42,866	— 264
West Ham Corp. ..	„ 26	6,347	5,419	— 928	43	254,315	+ 4,044
Wolverhampton Corp.	Feb. 1	2,306	2,277	— 29	44	102,861	— 4,060
„ Motor Buses	„ 1	612	666	+ 54	44	28,799	+ 8,844

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1920-21.	1921-22.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	Jan. 28	£75,451	80,036	4	£326,073	+ 2,864
Ballarat & Ben. (4 wks.)	Nov. 6	4,810	5,137	32	35,525	+ 2,525
Brazilian Traction (Mlrs)	Nov.	12,199,000	14,555,000	48	155,462,000	+ 33,156,000
Brisbane	Oct.	46,310	47,880	44	471,920	+ 12,590
British Columbia $	Nov.	858,842	877,335	22	4,252,802	+ 153,099
Buenos Aires Lacroze ..	Dec.	62,857	63,381	26	343,619	+ 7,333
Burmah Tr. & Lght. Rs.	Dec.	50,481	54,194	22	291,385	+ 32,657
Calcutta .. Rs.	Jan. 28	67,439	99,220	4	404,748	— 35,090
Cape Town	Dec.	29,768	31,521	..	..	..
Carthagena & Herrerias	Jan.	3,877	3,075	4	3,075	— 802
Cordoba	Dec.	19,299	22,641	39	207,992	+ 29,564
East India	Nov.	4,234	3,945	16	16,696	— 174
Kalgoorlie ..	Oct.	3,094	2,406	44	22,525	— 8,178
La Plata ..	Nov.	5,573	6,453	48	58,098	— 3,652
Madras (2 weeks) Rs.	Jan. 15	* 38,198	50,849	2	50,849	— 12,651
Manila .. .. $	Dec.	316,467	315,599	52	3,681,011	+ 262,605
Montevideo	Nov.	43,846	47,426	4	47,426	+ 3,580
Para	Dec.	24,253	22,660	4	22,660	— 1,593
Pernambuco	Jan. 29	4,672	3,595	4½	14,846	— 4,798
Port Elizabeth	Dec.	8,185	8,344	..	..	..
Rangoon .. Rs.	Dec.	120,000	137,750	52	1,628,551	+ 228,798
Shanghai .. $	Nov.	161,314	184,850	48	1,855,888	+ 189,000
Singapore .. $	Dec. 31	9,969	12,845	52	697,228	— 317,702
Toronto .. .. $	July	1,189,315	1,223,483	30	8,877,669	+ 642,606
Winnipeg .. $	Nov.	477,957	477,880	48	4,910,971	+ 156,466

* Strike of employees.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

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LONDON, FEBRUARY 11, 1922.

STANDARDISATION.

It would seem hardly necessary in these days to emphasise the value of standardisation of design, yet there is occasionally reason to fear that its advantages are not always kept fully in mind. To say that standardisation is synonymous with economy, and is the most effective way of ensuring quick delivery of material, is merely to recite a commonplace. The days of multiplicity of designs and patterns have in a large measure happily gone by, though the ideal of general standardisation in material and fittings has not yet been achieved. Managers of tramway systems, railways, motor vehicle services, and the firms which provide the equipment for these, are generally quite alive to the merits of interchangeability and mass production, but it is well that a word of warning should be uttered against the tendency in certain quarters to fail to co-operate fully in promoting standardisation. The tramway associations have standardised on most admirable lines the overhead equipment and fittings, and in conjunction with the Engineering Standards Committee some considerable time ago carried through a similar scheme in connection with tramway rails. They are now engaged on the standardisation of gear cases. To achieve these results entailed an enormous amount of labour and expenditure of time, and it is incumbent on tramway managers and engineers to see that the effort is not wasted. To deviate from a standard is largely to lose the value of it. Those who have taken a leading part in the promotion of standardisation are most anxious that all tramway operators should bear this fact in mind, and by conforming to the recommendations issued from time to time assist the object in view. Little differences of opinion over details should not be allowed to influence them against recognised standards, for it is obvious that if these are to be brought into use everyone must be prepared to make concessions, if necessary, in the common interest. To refuse to do so merely tends to obstruct economic production and therefore to keep up costs. It is not suggested, of course, that managements should scrap their existing equipment, or decline to introduce substantial improvements, but that when renewals are needed the standard construction should be adopted. One of the advantages of uniformity has been demonstrated on two or three occasions lately, in the matter of gauge. Instances have been reported in these columns where through-running has had either to be deferred or only achieved at considerable expense in track reconstruction. Such difficulties will naturally disappear in time, but meanwhile it rests with all concerned to second the efforts of those who have done so much in furtherance of standardisation.

GENERAL ELECTRIC COMPANY'S EXPANSION.

NOTABLE DEVELOPMENTS AT WITTON.

On Tuesday last the directors of the General Electric Company entertained a number of press representatives at their Witton Works, Birmingham, when a tour of inspection clearly demonstrated the remarkable developments which have taken place there during the past two or three years. The occasion was the celebration of the twenty-first anniversary of the commencement of the building of these works, which, with the latest additions devoted to the manufacture of electrical machinery of the largest type, together with suitable switch gears, places the company in a most favourable position to compete for the world's work.

Extensive as the G.E.C. works at Witton have now become, they are only a part of the company's organisation, as the full range includes some 20 establishments, each one devoted to the specialised production of one or more classes of electrical equipment, the possession of which enables the company to undertake the largest of contracts, either for railway electrification, power station equipment, or in other directions where the application of electric power is essential to progress. Many interesting examples of the company's manufacture were shown to the visitors, both in the finished state and in the various stages of construction. Amongst the large units that for the Glasgow Corporation Tramways—a 1,000 kw. rotary converter—attracted considerable attention, as did the 10,000 K.V.A. machines for the Borough of Marylebone, and a 12,500 K.V.A. machine for the Bury Corporation, each designed to run at a speed of 3,000 revolutions per minute. Many other sets of various capacity for a wide variety of uses both at home and abroad were seen, and it is gratifying to learn that orders of considerable importance have been secured which will keep the heavy engineering department fully employed for many months. Amongst these may be mentioned a 25-cycle 22,500 K.V.A. set to run at 1,500 r.p.m., for the Birmingham Corporation.

In the absence of Mr. Hugo Hirst through indisposition, Dr. Railing welcomed the guests and explained the object the company had in view. He gave it as his opinion that manufacturers in this country had too long looked admiringly at the progress of foreign rivals. The General Electric Company were determined to take an important part in the world's electrical development, and aimed at building up an organisation which would command the respect not only of engineers in this country, but of the whole world.

SUNDERLAND TRAMWAY STRIKE.

COMPANY'S SERVICE SUSPENDED.

The strike of employees of the Sunderland District Electric Tramways, Ltd., which was briefly reported in our issue of last week as having commenced on February 2, has been continued. It was caused by the men's refusal to accept wage reductions which, in the case of the higher paid men, would have amounted to 10s. per week in addition to the automatic reduction of 3s. which was due under the National Agreement to take effect from February 1.

In a statement to the press, Mr. G. Stratton, the resident manager and engineer, contradicts the statement by the men that arbitration has been refused. Mr. Stratton says it had never been mentioned. The men asked that the matter should go to the Joint Industrial Council, but the company having broken away from that body without giving notice could not expect the Council to consider a case where their own agreement had been broken. The Company should have given three months' notice of its intention to leave the Council, but the serious fall in revenue meant that the company could not go on paying the present high wages for even three months more. The strikers are supported in their action by the Transport and General Workers' Union.

LONDON AND BRIGHTON RAILWAY ELECTRIFICATION.

THE G.E.C. CONTRACT.

A contract in connection with the extension of the electrification of the London, Brighton and South Coast Railway has been placed with the General Electric Co., Ltd., who will undertake the necessary manufacture at their Witton Engineering Works, Birmingham. Work will begin within the next few months, and will be completed within 12 months.

It is understood that the contract, which is one of several that will probably arise out of the grouping system consequent upon last year's Railway Act, is for the provision of the whole of the electrical equipment for twelve additional motor coaches, each of 1,000 h.-p., to enable the section of the line from Balham through Thornton Heath to Selhurst and West Croydon to be operated electrically.

The equipment is for employment with single-phase alternating current, and as the manufacture of this class of apparatus was formerly mainly in the hands of Germany, the significance of the contract from the British national standpoint will be appreciated.

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L.C.C. TRAMWAY MATTERS.

At the meeting of the Council on Tuesday several reports from the Highways Committee were brought up and the recommendations therein were adopted.

TRAMWAY PROPOSALS FOR THE NEXT SESSION.

On the recommendation of the Highways Committee the Council on November 15 decided to seek Parliamentary powers in the session of 1922 to authorise, among other proposals, the construction on the overhead trolley system of a tramway from Seven Sisters Road to Stamford Hill, *via* Amhurst Park. Under the standing orders of Parliament the consent of the Hackney Metropolitan Borough Council is necessary, and that Council have intimated that they would be prepared to give their consent upon the following conditions :—

1. A small widening to be carried out at the end of Amhurst Park, provided that the necessary property can be obtained at a reasonable cost to be agreed between the Council and the Borough Council.
2. The cost of the paving with wood the breasts of the carriageway in Amhurst Park within the borough of Hackney to be paid by the Council, the Borough Council to bear the cost of the concrete foundations and to undertake the future maintenance of the paving.
3. The Borough Council to be given in the Bill the power of reasonably approving the position of the posts carrying the overhead equipment.

The Highways Committee regarded these conditions as reasonable and recommended their acceptance. The cost of this line is estimated at £74,715, and even with the additional charges provided by the agreement with Hackney it is not expected that the cost will be exceeded.

RECONSTRUCTION OF PADDENSWICK ROAD TRAMWAYS.

The Committee had agreed to the Council undertaking the construction under certain conditions of the tramways in Paddenswick Road, Hammersmith, belonging to the London United Tramways.

LEYTON TRAMWAYS STAFF.

In connection with the transfer of the working of the Leyton tramways as from July 1, 1921, as part of the Council's tramways system, the Committee terminated on December 31 the services of Mr. J. Duncan as Leyton traffic superintendent, and of Mr. E. J. Hammett as Leyton car shed superintendent. The vacant positions on the operative staff of the Council's tramways of district traffic superintendent and car inspector respectively have been offered to them. Consideration of the question of dealing with the remainder of the staff of the Leyton Council has been deferred until the report of the Special Committee on Organisation of the Council's service, so far as it concerns the reorganisation of the departments, has been dealt with.

DELAYS OWING TO BREAKDOWNS.

The Highways Committee have had before them the question of the number of delays to the Council's cars due to breakdowns, etc., and steps have been taken with a view to facilitating the work of the breakdown staff in dealing with breakdowns on the tramway tracks of vehicles other than tramcars. Experiments have also been carried out in order to reduce the number and length of delays due to bus-bar lead troubles, damaged ploughs, etc.

GREENWICH POWER STATION.

The following expenditure was sanctioned at Greenwich power station :—(1) Alterations to coal shoots, £170 14s. 6d. (additional) ; (2) provision on trial of a "Copes" feed-water regulator, £55 ; (3) purchase of an army hut and re-erection of the hut at the power station for use as a recreation room, £500 ; (4) repair of one steam turbine rotor, £65 12s. ; and (5) work in connection with the installation of new coal-handling and conveying plant, £2,000. The general manager has been authorised to purchase oil fuel, as well as coal and coke, as and when required for the power station. The tender of Maden & McKee, Ltd., amounting to £2,250, has been accepted for the purchase and removal of reciprocating engine set No. 4 and spare parts. The offer of W. & T. Avery, Ltd., to undertake fortnightly instead of monthly inspections of the two coal weighbridges on the pier jetty for an extra charge of £15 4s. a year has been accepted.

ACCIDENTS—INSTRUCTIONS TO DRIVERS AND CONDUCTORS.

Mr. W. J. Squires, in reply to questions as to instructions given to drivers and conductors in case of accident, said that the only instructions given are contained in a service general order which was first issued on January 5, 1905, and has been in force since that date. The order is as follows : "In all cases of accidents information must at once be sent to the Chief Officer. No statement is under any consideration to be made to the police or public. The motorman will, if requested to do so, give car or badge number." He was unaware that there is any general rule applied to street accidents in London. No complaints with reference to the service general order have been made by either High Court or County Court Judges. Correspondence was at the present time proceeding between the Commissioner of Police and the General Manager of Tramways on the matter with a view to ascertaining whether any modification of the order in question is called for.

Railway Companies and Road Passenger Services.—On February 2 the Metropolitan Municipal Tramways Council, accompanied by Mr. J. Beckett, general secretary of the Mnuicipal Tramways Association, had an interview with Mr. Thornhill, solicitor of the London and North Western Railway Company, who is acting for the North Western and Midland Group in the promotion of the Bill for which application is being made to Parliament in the next session. Subsequently it was officially notified that the railway companies proposed to withdraw from the Bill at the appropriate time all powers relating to the carriage of passengers by road.

MISCELLANEOUS NEWS AND NOTES.

Forty-eight Hour Week.—Accrington Tramways Committee have granted the request of the employees for a return to the guaranteed week of 48 hours.

Birmingham Employees and National Agreement.—Birmingham Corporation tramway employees have decided to oppose any variation of the National Agreement of 1919.

Liverpool Tramway Extension.—The City Council have decided to lay a double tramway track, as an extension, along Belvidere Road and Devonshire Road, at a cost of £38,213.

Loss on Barrow Tramways.—At a meeting of the Barrow Town Council it was stated that the tramway service was losing £200 a week, and 1d. fares for shorter stages were advocated.

Berlin Tramway Strike.—The strike of the whole of Berlin municipal employees which commenced last Saturday (February 4) has resulted, among other inconveniences, in a cessation of the tramway service.

Proposed Hull Tramway Extension.—The City Council have decided to apply to the Ministry of Transport for an Order under the Light Railways Act, 1896, to enable them to extend the tramways to Hessle, at an estimated capital cost of £36,000.

Lewisham Opposes London "Railless" Scheme.—Lewisham Borough Council have resolved to oppose the London County Council project for the introduction of trolley omnibuses from the boundary of the borough at Sydenham to Lee Green via Catford.

New Yorkshire Omnibus Service.—The Yorkshire (West Riding) Electric Tramways Company have decided to organise a comprehensive omnibus service between Wakefield and the surrounding towns and villages. A large number of vehicles has been ordered and experimental runs have already been made.

Joint Industrial Council Meeting Postponed.—The meeting of the National Joint Industrial Council for the tramways industry which should have been held at Montagu House, Whitehall, on Thursday, to discuss the report of the special committee appointed to consider the revision of the national agreement of March, 1919, was postponed until Wednesday next.

York Tramways and the Joint Industrial Council.—At York City Council on Monday, criticisms were levelled at the Electricity and Tramways Committee for refusing to reconsider their decision to withdraw from the District Joint Industrial Council for the tramways industry. One member asserted that the committee ran away from the national body when an increase in wages was awarded, but when reductions came along they allowed themselves to be governed by the national settlement. Alderman C. W. Shipley (chairman of the Tramways Committee) said the difficulty was caused through the men continually leaving one trades union and joining another, according to which had secured the highest award. An amendment to refer the matter back was defeated.

Another L.C.C. Poster.—The latest poster issued by the London County Council tramways informs the public that the total cost of the system was £14,500,000, and that the capital repaid out of the revenue is £6,000,000. The amount paid last year for interest and redemption of debt was £600,000. "When the balance has been paid off," the wording concludes, "Londoners will own the finest tramway in the world, and debt charges will be nil."

The Smartest Underground Stations.—The awards were recently made in the London Underground Railways' half-yearly inter-station competition for general smartness. The winning stations on the various lines are the following :—District Railway, Mansion House ; City and South London, Bank ; Central London, Bank and Post Office ; Bakerloo, Waterloo and Lambeth ; Piccadilly, Finsbury Park and Gillespie Road ; Hampstead and Highgate, Highgate.

Ashover Light Railway Scheme.—An inquiry was held at Chesterfield on February 1 into the application of the Ashover Light Railway Company to construct their proposed line between Stretton and Ashover (sanctioned in 1919), with a 2-ft. gauge instead of standard gauge, and to extend the terminus to Clay Cross. The chief object of the railway is to open up limestone and lead quarries. The line would be 2¾ miles long, and the estimated cost of the 2-ft. gauge track is £37,000.

Glasgow's Proposed Acquisition of Paisley Tramways.—The committee of Glasgow Corporation charged with tramway extension policy have again considered the suggested purchase of the undertaking of the Paisley District Tramways Company, which has frequently come before the City Council. The committee have now referred the matter to Mr. J. Dalrymple, the general manager, to report further on the advantages which might accrue to Glasgow by the acquisition of the Paisley undertaking.

"Keep to the Left" Rule Favoured.—Glasgow magistrates, after having received a recommendation from the Tramways Committee, have decided to adopt the "Keep to the Left" rule of the footpath. Notices bearing this injunction are to be affixed to the lamp posts and inside the tramway cars. At Manchester, the Chief Constable has advocated a similar rule, in a report to the Watch Committee on the dangers and inconveniences of street traffic as seen in Manchester. This report is to be forwarded to the Transport Ministry.

Tramway Accidents at Rochdale and Glasgow.—A Rochdale single-deck tramcar, the brakes of which failed to act, on Thursday ran down the steep gradient in John Street for 400 yards, into Smith Street, where it crashed into a shop front. It then swerved round and overturned, injuring 17 passengers. A Glasgow car on Wednesday collided with a lorry on a steep decline and the motorman was thrown out. The car travelled unattended for a quarter of a mile and then collided with a motor lorry. Nine persons were injured.

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Loyal Belfast Tramwaymen.—Councillor W. G. Turner, chairman of Belfast Tramways Committee, informed the City Council that he had received many expressions of appreciation of the loyalty of the motormen and conductors during the last 18 months under very trying circumstances. During the whole of that period not one member of the traffic staff refused to pass through the dangerous areas. The committee, recognising the strain placed on these men, decided, in response to an application from their trade union, to grant them four days' extra holiday this year.

T.O.T. Philharmonic Society's Performance.—The dramatic section of the T.O.T. Philharmonic Society, consisting of employees of the London Underground group of companies, gave an excellent performance of Edward German's comic opera "Tom Jones" at King's Hall, Covent Garden, on Wednesday and Thursday evenings. The whole of the caste and the orchestra—also composed of amateurs—acquitted themselves very creditably and the appreciation of the audience was expressed at the close of Thursday' evening's performance by Mr. H. E. Blain, C.B.E., assistant managing director.

Newcastle Tramway Employees' Hours.—Newcastle-on-Tyne tramwaymen held a meeting on Sunday, at the conclusion of which it was stated that the business dealt with was a proposed amendment to the National Tramway Agreement of 1919, put forward by the employers, for a revision of hours and conditions of service. On this there was a general discussion. A resolution was also passed to the effect that if no further communication was received from the Transport and Electricity Committee, the men would resist the increase of hours from 44 to 48 a week, which the committee intend to put into operation on February 26.

Road Transport Workers' Wages.—The London Cartage and Haulage Association, and the Transport and General Workers' Union continued their negotiations in London on Tuesday respecting the employers' application that there should be a further reduction of 3s. per week in the wages of road transport workers in the London area. The men had refused to accept the reduction. No definite agreement was reached on Tuesday, but an official of the union said there was every reason to believe that a settlement would be arrived at when the adjourned conference took place on February 16. In the meantime the existing wages would continue.

Glasgow Subway is to be closed on Sunday, February 19, until further notice, owing to the revenue being insufficient to meet the expenditure. The subway was opened twenty-five years ago. It was at first successful, but the competition of the Corporaion electric tramways red ced the traffic receipts and in recent years the company has been unable to pay more than a small instalment of the interest on the preference capital, while last year there was a deficit of £15,000. The issued capital consists of £1,250,000 in preference and ordinary shares. A full account of the undertaking was published in the TRAMWAY AND RAILWAY WORLD of August, 1897.

Electrical Engineers' Wage Reductions.—The engineers employed in electric railway generating stations and sub-stations in London have ratified a new provisional agreement with the railway companies. The original demand of the companies for a reduction of 12½ per cent. in wages has been withdrawn, and it has been agreed that the sliding scale arrangement under the No. 10 Joint Industrial Council Award for the Electrical Supply Industry shall become operative. Instead of suffering a reduction in wages of from 12s. to 14s. per week, the men will in effect lose 6s. per week, the reduction being spread over a period of nine weeks. Thereafter wages will be governed by the cost of living.

Scottish Tramways and Unemployment Grants.—When Aberdeen Corporation Tramways Committee discussed the relaying of lines in Queen's Road, Great Western Road, and Union Street, letters were read from the Government Unemployment Grants Committee stating that, owing to a limitation of funds, they could not give the department a grant towards the cost of the work. The committee agreed to associate themselves with the Glasgow Town Council in protesting against the action of the Government. The committee agreed that the reconstruction of the Great Western track should be done by the burgh surveyor's department, and the Queen's Road section be let out to contract.

Proposed Tramway Extensions at Doncaster.—An inquiry on behalf of the Ministry of Transport was held at Doncaster on January 31 into an application by the Corporation for powers to construct a tramway loop line connecting the Frenchgate track with Station Road, to double the track from Station Road to the Clock Corner, and place the track in the centre of the widened thoroughfare, and also to double the track for a short distance in Baxtergate, at a total cost of £10,000. Alderman Balmforth (chairman of the Electricity and Tramways), Mr. T. Potts (tramways manager), and Mr. F. O. Kirby (Borough Surveyor) gave evidence in support of the application. The inquiry was closed.

Passing a Stationary Car: Manslaughter Charge.—A case which is likely to have an important bearing on the liability of vehicle drivers when passing stationary tramcars will probably result from an inquest held at Lewisham on Monday, when Albert Selves, a Maidstone motor driver, was committed for trial on a charge of manslaughter. The inquiry was in respect of the death of an old man who died from injuries received on being knocked down, when about to board a tramcar, by a steam lorry driven by Selves. Selves said he was driving about six miles an hour. He saw the tramcar slow up and the people waiting to get on, and he sounded his horn. He could have pulled up, but he thought there was plenty of room to pass. The deceased stepped back and was caught by the engine. A son of the deceased asked Selves whether he knew the rule of the road when people are boarding tramcars. Selves: No. The Coroner: There is no legal rule of the road. It would be a good thing if there were. He added that there was not the slightest doubt that such vehicles should not pass a stationary car, but there was no law to prevent it. The whole question was: Did the driver take reasonable care? The jury found that the driver of the lorry was responsible for the man's death through gross negligence. The Coroner said that was a verdict of "Manslaughter."

LONDON UNDERGROUND RAILWAY DIVIDENDS.

METROPOLITAN DISTRICT.—Dividend on the ordinary for 1921 of 1 per cent.; £65,000 to reserve, leaving £60,550 to be carried forward. The dividend on the ordinary shares is the first paid since 1882, when the distribution was at the rate of $\frac{5}{16}$ per cent.

LONDON ELECTRIC.—Final dividend on the ordinary of 1¼ per cent., making 3¼ per cent. for the year; £65,000 to reserve, leaving £39,700 to be carried forward.

CITY AND SOUTH LONDON.—Final dividend on the ordinary of 1¼ per cent., making 3¼ per cent. for the year; £36,000 to be placed to reserve (an addition of £11,000 compared with the previous year), leaving £25,000 to be carried forward.

CENTRAL LONDON.—Final dividend on the ordinary stock of 2 per cent., making 4 per cent. for the year. Final dividend on the preferred ordinary stock of 2 per cent., making 4 per cent. for the year. Dividend for the year on the deferred ordinary stock of 4 per cent.; £29,000 to reserve (an addition of £9,000 compared with the previous year), leaving £59,600 to be carried forward.

LONDON GENERAL OMNIBUS.—Final dividend on ordinary of 3½ per cent., free of income tax, making 8 per cent., free of income tax, for the year; £335,000 to be placed to reserve, leaving £67,900 to be carried forward.

ASSOCIATED EQUIPMENT COMPANY.—Trading results for the year do not justify the payment of a dividend on the ordinary shares.

UNDERGROUND ELECTRIC RAILWAYS OF LONDON.—Full interest on six per cent. first cumulative income debenture stock, and 2 per cent., free of income tax, on six per cent. income bonds of 1948 for the half-year, with a carry-forward of £26,600.

SOUTH METROPOLITAN TRAMWAYS.—The South Metropolitan Electric Tramways and Lighting Company recommend a dividend on the ordinary shares for the year of 7½ per cent., placing £15,000 to reserve for reconstruction and renewals (an addition of £4,500 compared with previous year), leaving £2,864 to be carried forward, compared with £1,556 brought in.

LONDON AND SUBURBAN TRACTION.—Subject to confirmation in general meetings of the respective dividend announcements by the various companies in which it is interested, and subject to final audit of accounts, the revenue of the London and Suburban Traction Company will enable it to pay 3½ per cent. in respect of arrears on its five per cent. cumulative preference shares, with a carry-forward of £11,523, compared with £1,205 brought in.

METROPOLITAN ELECTRIC TRAMWAYS.—The Metropolitan Electric Tramways recommend a dividend of 7 per cent. on the five per cent. cumulative preference shares, being balance of 4½ per cent. for the year ended December 31, 1919, and 2½ per cent. on account of year ended December 31, 1920, placing £67,500 to reserve for reconstruction and renewals (an addition of £57,500 compared with previous year), leaving £2,420 to be carried forward, compared with £1,538 brought in.

FINANCIAL.

London and Suburban Traction Group.—The receipts for the week ended February 4 were £45,051 (previous week £41,757). The aggregate from January 1 to date amounts to £220,755.

London Underground Group Receipts.—The receipts of the Common Fund Companies for the week ended February 4 amounted to £204,824 (previous week £192,358). The aggregate from January 1 to date amounts to £1,022,221.

Tyneside Tramways and Tramroads Company.—The accounts for the half-year ended December last show a surplus of receipts over expenditure of £4,971, and £140 is brought forward. A dividend is announced at the rate of 2½ per cent. on the ordinary shares; the reserve and depreciation fund is increased by £500 and £591 is carried forward.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended February 8 amounted to £88,751, a decrease of £8,778 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year) to February 8 (45 weeks) the total receipts were £4,400,910, an increase of £219,054 on the corresponding period of 1921.

Dublin United Tramways Company, Ltd.—The directors recommend a dividend at the rate of 6 per cent. per annum, less income tax, on the preference stock for the half-year ended December 31, and a final dividend at the rate of 7 per cent., less income tax, making 5 per cent. for the year, on the ordinary stock for the same half-year, setting aside £35,000 towards the renewal of track. The dividends and sum set aside for renewal will absorb £83,300, leaving £12,478 to be carried to the next account. The traffic receipts amounted to £675,410, an increase of £74,063, as compared with the previous year. Other receipts amounted to £20,316, the total receipts being £695,726. The number of passengers carried aggregated 7,249,897, or in increase of 1,165,121. The lines worked by the company are the same as a year ago, *viz.*, 54 miles 15.25 chains, and the company has 326 cars. The total kw.h. generated was 13,766,026.

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Liverpool Tramways Deficit.—Mr. Frank Wilson (chairman of Liverpool Tramways Committee) has stated at the City Council that the tramway income last year was £101,000 more than the year before, but there was a deficiency of £48,000 to be added to the previous year's deficit of £33,000. The cost per car mile to-day was 2s. 1d., as compared with 10d. or 11d. before the war. due to increased wages, which were higher in Liverpool than in any other town in the kingdom.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended January 28 give total receipts of £338,819, or £44,130 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £173 18s. 7d. per mile of single track, and last year at the rate of £196 11s. 8d., thus showing a decrease for the week of £22 13s. 1d. per mile open.

PERSONAL.

Councillor W. G. Turner was unanimously re-elected chairman of Belfast Tramways Committee, and **Councillor D. Anderson** vice-chairman.

Sir John Snell, chairman of the Electricity Commissioners, has so far recovered from an attack of bronchitis that he was able to return from Barrow-in-Furness on Monday. It is hoped that he will be able to resume his duties in a few days.

Sir George Carter, managing director of Cammell Laird & Co., Ltd., died at the residence of his brother-in-law at Barton, Yorkshire, on Thursday. Born in 1860 at Gosport, Sir George spent 25 years in the service of Sir W. G. Armstrong, Whitworth & Co., being appointed shipyard manager at the age of 34 and later a director of the company. In September, 1912 he resigned his position at Elswick to become managing director of Cammell Laird. Sir George received the honour of K.B.E. in 1917.

CONTRACTS.

Bournemouth Tramways Committee have accepted the tender of Walter Scott, Ltd., for 220 tons of new rails at £13 17s. 6d. per ton.

Bolton Tramways Committee have recommended acceptance of the tender of the Equipment and Engineering Co. (London) for a rail grinder and a welder for use on the tramway track.

Leyton Corporation have been recommended to accept the tender of the Brush Electrical Engineering Co. for the supply of a charging motor generator for the electric vehicle garage at £410 5s.

Straker-Squire Omnibuses.—The Progressive Motor Omnibus Co., of Wellingborough, who have already concentrated on Straker-Squire single and double-deck omnibuses, are running services in and about the county of Lincolnshire, where they are opening up several new routes. We are informed that Messrs. Straker-Squire, Ltd., whose "A" type chassis is so favourably known, have received a repeat order for 12 additional single and double-deck omnibuses, which will be built complete in their factory at Edmonton.

TENDERS INVITED.

COUNTY BOROUGH OF WEST HARTLEPOOL.

Tramways Department.—Tramway Employees' Uniforms.

Tenders are invited for the supply and delivery of Uniforms required for the year ending March 31, 1923.

Specification and Form of Tender can be obtained from the undersigned. Tenders, marked "Tramway Uniforms," must be delivered to the Town Clerk, Municipal Buildings, West Hartlepool, not later than 12 noon on Friday, February 17, 1922.

The Corporation do not bind themselves to accept the lowest or any Tender.

T. G. RICHARDSON,
General Manager.

Tramway Office,
67, Church Street, West Hartlepool.
February 6, 1922.

CITY OF ABERDEEN.

Tramways Department.

Uniform Clothing for Tramway Employees.

The Corporation of Aberdeen are prepared to receive Tenders for the supply of Uniform Clothing and Caps for Inspectors, Motormen, Conductors and Parcel Boys.

Forms of Tender may be had on application to the undersigned at the Tramways Office, Municipal Buildings, Aberdeen.

Tenders must be made on the Forms provided, and must be handed in not later than 12 o'clock noon on Friday, February 24, 1922.

The Corporation do not bind themselves to accept the lowest or any Tender. The Contractors will be required to pay not less than the standard rate of wages relating to the particular trades to which the specification applies.

WILLIAM FORBES,
General Manager.

Corporation Tramways Office,
Municipal Buildings, Aberdeen.
February 3, 1922.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	Feb. 1	3,497	2,974	— 523	35¾	126,666	— 11,323
„ Motor Buses	„ 1	60	130	+ 70	35¾	8,757	+ 7,800
Ayr Corporation ..	„ 4	549	436	— 113	38	28,080	— 1,943
Barrow Corporation ..	„ 4	892	683	— 209	44	37,028	— 2,896
Belfast City	„ 3	11,490	12,175	+ 685	44	554,111	+ 49,650
Birkenhead Corporation	„ 5	2,587	2,515	— 72	43¾	115,797	— 12,946
„ Motor Buses	„ 5	364	500	+ 136	43¾	29,801	+ 11,420
Birmingham Corporat'n	Jan. 28	32,989	27,836	— 5,153	43	1,263,274	— 106,137
„ Motor Buses	„ 28	1,901	1,618	— 283	43	83,716	— 1,127
Blackburn Corporation	Feb. 1	2,558	2,172	— 386	44½	106,167	— 9,678
Bradford Corporation..	„ 4	13,975	13,310	— 665	44	604,665	+ 12,314
Burnley Corporation ..	„ 4	3,470	3,260	— 210	..	..	..
Burton-on-Trent Corp.	„ 5	644	597	— 47	44	27,680	+ 497
Bury Corporation ..	„ 5	2,349	2,160	— 189	44¾	107,959	— 4,716
Chatham & District ..	Jan. 26	1,628	1,373	— 255	4	5,252	— 1,162
Chesterfield Corporat'n	Feb. 6	623	571	— 61	45	26 344	— 536
„ Motor Buses	„ 6	863	660	— 203	45	34,147	— 2,172
Derby Corporation ..	„ 4	2,247	2,041	— 206	44	95,218	— 6,513
Dundee City ..	„ 1	3,196	2,848	— 348	37¾	120,403	+ 5,658
East Ham Corporation	„ 4	2,153	2,103	— 50	44¾	98,724	+ 2,077
Edinburgh Corp. Trys.	Jan. 28	..	10,103	..	37	472,058	+ 6,330
„ Motor Buses	„ 28	..	2,899	..	37	132,614	..
Glasgow Corporation ..	Feb. 4	47,367	43,525	— 3,842	35½	1,610,523	+ 8,204
Glossop (U.E. Sup. Co.)	„ 4	225	214	— 11	5	1,152	— 56
Halifax Corporation ..	Jan. 31	4,458	3,676	— 782	42¾	189,038	+ 1,656
„ Motor Buses	„ 31	120	73	— 47	42¾	3 403	— 1,500
„ Railless Cars	„ 31	..	31	..	28	1,523	..
Huddersfield Corporatn.	Feb. 4	5,219	4,970	— 249	45	233,946	+ 9,375
Ilford U.D. Council ..	„ 4	1,261	1,434	+ 173	44¾	66,551	+ 9,516
Ipswich Corporation ...	„ 4	805	757	— 48	44	38,224	— 4,877
Isle of Thanet ..	„ 1	507	528	+ 21	17	11,131	+ 1,079
Kilmarnock Corporat'n	„ 4	372	314	— 58	37¾	13,676	— 368
Leicester Corporation..	„ 4	6,396	7,167	+ 771	5	35,492	+ 2,650
Liverpool Corporation	„ 4	26,678	28,288	+ 1,610	5	144,344	+ 9,413
London County Ccl. ..	„ 8	97,529	88,751	— 8,778	45	4,400,910	+ 219,054
Maidstone Corporation	„ 2	405	395	— 10	43	21,002	— 451
Manchester Corp. ..	„ 4	38,661	36,496	— 2,165	44	1,711,151	+ 186,748
Newcastle-on-T. Corp.	Jan. 28	11,707	9,606	— 2,101	43	484,645	+ 8,056
Nottingham Corp. ..	Feb. 2	7,698	7,840	+ 142	44	300,342	— 40,977
Oldham Corporation ...	„ 3	4,483	4,342	— 141	46	216,334	+ 3,129
Preston Corporation ...	„ 1	2,006	1,783	— 223	43¾	83,924	+ 3,583
Reading Corporation ...	„ 2	1,586	1,430	— 156	44	69,831	— 3,547
„ Motor Buses	„ 2	241	291	+ 50	44	14,992	+ 3,320
Rotherham Corporation	„ 6	2,750	2,242	— 508	44	99,735	— 18,038
Salford Corporation ..	„ 5	10,977	10,256	— 721	43¾	473,655	+ 21,935
Sheffield Corporation..	„ 5	20,706	18,262	— 2,444	44¾	862,375	+ 63,924
Southampton Corp. ..	„ 2	3,083	3,039	— 44	44	130,388	— 8,690
„ Motor Buses	„ 2	201	103	— 98	44	6,805	— 4,068
Southend-on-Sea Corp.	„ 8	1,525	1,730	+ 205	45	122,115	+ 7,122
South Shields Corp. ..	Jan. 28	1,982	1,573	— 409	44	73,692	— 10,129
St. Helens Corporation	Feb. 4	2,189	1,581	— 608	44	78,771	— 13,028
Sunderland Corp. ..	„ 5	2,754	2,432	— 322	44	115,511	— 20,243
Swindon Corporation..	„ 1	383	351	— 32	43¾	17,341	+ 253
Tyneside Trys., Trds...	Jan. 25	1,129	784	— 345	4	2,802	— 1,363
Wallasey Corp. ..	Feb. 4	2,661	2,391	— 270	44¾	123,897	+ 7,509
„ Motor Buses	„ 4	134	175	+ 41	44¾	10,502	+ 2,880
Walsall Corporation ..	„ 4	1,937	1,529	— 408	45	72,485	— 7,795
„ Motor Buses	„ 4	1,388	886	— 502	45	41,380	— 10,596
Walthamstow U.D.C....	„ 4	1,817	1,710	— 107	44¾	90,272	— 270
Warrington Corp. ..	„ 2	1,108	1,047	— 61	44	43,913	— 325
West Ham Corp. ..	„ 2	6,141	5,829	— 312	44	260,145	+ 3,732
Wolverhampton Corp.	„ 8	2,278	2,137	— 141	45	104,998	— 4,200
„ Motor Buses	„ 8	679	635	— 44	45	29,434	+ 8,800

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1920-21.	1921-22.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	Feb. 4	£78,096	81,194	5	£407,267	+ 5,962
Ballarat & Ben. (4 wks.)	Nov. 6	4,810	5,137	32	35,525	+ 2,525
Brazilian Traction (Mlrs)	Nov.	12,199,000	14,555,000	48	155,462.000	+33,156,000
Brisbane .. .	Jan.	46,280	48,790	4	48,790	+ 2.510
British Columbia $	Dec.	917,668	940,113	26	5,192,915	+ 175,554
Buenos Aires Lacroze .	Jan.	61,111	61,198	30	404,817	+ 7,420
Burmah Tr. & Lght. Rs.	Dec.	50,481	54,194	22	291,385	+ 32,657
Calcutta .. Rs.	Feb. 4	* 1,359	101,078	5	505,826	+ 134,809
Cape Town	Dec.	29,768	31,521	..	..	..
Carthagena & Herrerias	Jan.	3,877	3,075	4	3,075	— 802
Cordoba	Dec.	19,299	22,641	39	207,992	+ 29,564
East India	Jan.	4,299	4,080	26	24,834	— 606
Kalgoorlie ..	Nov.	2,969	2,419	48	24,944	— 8,728
La Plata ..	Nov.	5,573	6,453	48	58,098	— 3,652
Madras (2 weeks) Rs.	Jan. 31	* ...	54,390	4	105,239	— 67,041
Manila .. .. $	Dec.	316,467	315,599	52	3,681,011	+ 262,605
Montevideo	Nov.	43,846	47,426	4	47,426	+ 3,580
Para	Dec.	24,253	22,660	4	22,660	— 1,593
Pernambuco	Feb. 5	5,013	3,961	5½	18,807	— 5,850
Port Elizabeth	Dec.	8,185	8,344	..	..	..
Rangoon .. Rs.	Dec.	120,000	137,750	52	1,628,551	+ 228,798
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Dec. 31	9,969	12,845	52	697,228	— 317,702
Winnipeg .. $	Nov.	477,957	477,880	48	4,910,971	+ 156,466

* Strike of employees.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

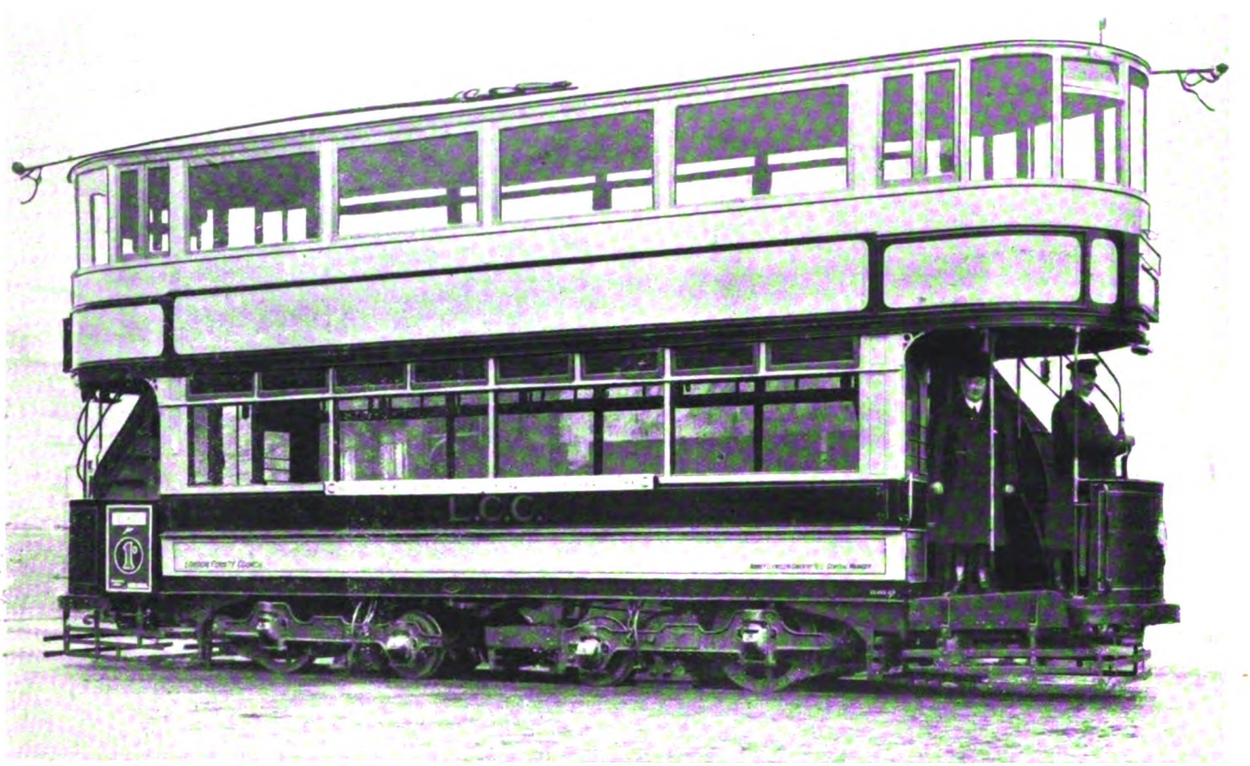
Founded 1892. LONDON, FEBRUARY 16, 1922. VOL. LI.

NEW CARS FOR LONDON COUNTY COUNCIL TRAMWAYS.

MOTORS OF 60 H.P. TO INCREASE TRAILER CAR SPEEDS—IMPROVED LIGHTING AND VENTILATION—PLATFORM GUARDS WITH SIDE AND FRONT OPERATION.

On January 27, members of the Highways Committee of London County Council and representatives of the Press had an opportunity of inspecting and travelling on one of the 125 new tramcars which are now being delivered. The party were taken from the Victoria Embankment to the central car repair shops at Charlton, and thereafter to the power station at Greenwich. Everything worked smoothly and the new car's capabilities were much admired. At the time of the inspection about a dozen of the new cars had been delivered. Out of the total, 75 car bodies are being built by the Brush Electrical Engineering Company, Loughborough, and 50 by Hurst, Nelson and Company, Motherwell. The electrical equipment of 75 of the cars was made by the English Electric Company, and of the other 50 by the Metropolitan-Vickers Electrical Company.

In general appearance the new cars are similar to the familiar two-bogie, double-deck, roof-covered cars seating 78 passengers each (32 on the lower and 46 on the upper deck) with which the metropolitan public are familiar. There are, however, various improvements in detail.



New London County Council Car—At the Right the Step is seen Raised with the Side Guard in Position.

These cars have been designed specially to suit the particular conditions of traffic which have to be met in dealing with the requirements of London's tramway travelling passengers during the rush hours of each working day between about 7.30 and 10 o'clock in the morning, and 4.30 and 8 o'clock in the evening.

They are equipped with motors of greater horse-

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power than those which have been previously used, in order that with equivalent loads of passengers, proportionately higher average rates of service speeds may be assured on the particular routes to which the cars are allotted for service. Provision is made on each car to permit of its use for drawing a trailer car, and when so used it is anticipated that the increased rate of service speed which is obtainable with the new motors will be especially marked.

In regard to dimensions, they are practically identical with the majority of the bogie cars already in use on the undertaking. The clearances available under certain bridges which have to be negotiated (especially when the cars are, as is now the case, fitted with trolleys in addition to plough gear, to permit of inter-running over routes constructed on either the slot conduit or overhead line systems of traction), are not such as to allow much variation in the way of increased dimensions.

The principal dimensions are as follow—

	Ft.	in.
Length over fenders	33	10
Length of main body over corner pillars ...	22	2
Width over guard rails	6	10
Extreme width over roof drip rails	7	2
Width over body framing	6	8
Height from rail to top of roof (outside) ...	15	7¼
Extreme overall height from rail over trolley equipments	16	1
Height from floor to ceiling, lower saloon ...	6	3
Height from floor to ceiling, upper deck ...	6	2
Height from rail level to top of fender (buffer height)	2	3¾
Extreme wheel base	14	6
Centres of pivotal points	13	4
Centres of body bolsters	10	6

The bodies are built upon steel underframes of the deep plate side girder type, composed of rolled and pressed steel members, all rigidly riveted together, except in cases where considerations of repairs render their prompt dissembly and re-erection in a running depot a matter of desirability, in which cases machined fitting bolts are used. The body bolsters and side rubbing plates are of new designs, each of which consists principally of two pressed steel joists or girders of an approximately fish-bellied form, braced and riveted together in such a manner as to enable a number of other smaller unit parts, previously used, to be dispensed with. This new type of bolster is made of such dimensions as to ensure its interchangeability as a complete unit with those on the existing cars, for which it will accordingly be used in future when replacements are needed.

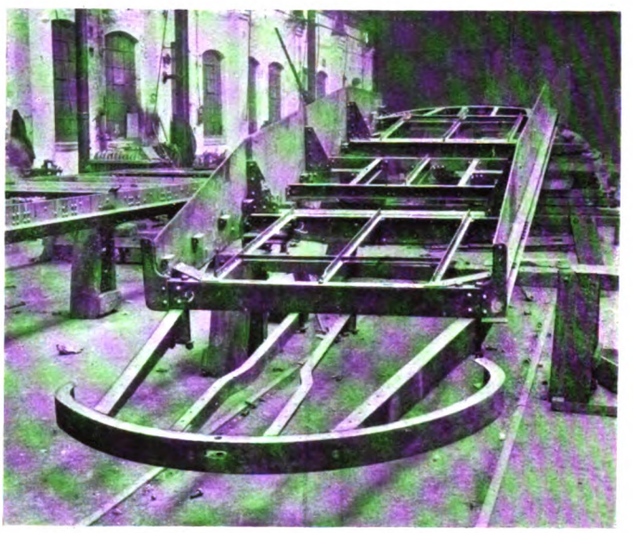
The platforms are constructed principally of rolled angle and channel steel bars, which are assembled into complete units independently of the main frame, to which they are secured by an arrangement of stirrup plates with shearing points in specially located rivets and packing plates, all so arranged that in the event of a collision the platform will carry away clear from the main frame, with a minimum of damage or distortion to the latter.

The framing of the bodies is carried out, so far as the majority of the members is concerned, in high grade Moulmein teak, with the addition of specially selected straight grained pitch pine in the case of certain of the longitudinal members for which in practice it has been found to be suitable.

The roof sticks, bends and some other framing members, which are well protected from possibility of dampness, are fashioned from tough ash, and the whole securely tied and bound together by steel flitch plates, tie rods, corner knees and rolled steel car-lines of angle section, as necessary.

The exterior panelling of the cars is, so far as the lower saloons are concerned, of Honduras mahogany, and on the upper decks of steel sheeting arranged in such a manner as to provide a definite cantilever construction for supporting the ends of the top covers above the platforms, without any necessity for the interposition of adjustable truss rods. The interiors of both the lower saloons and upper decks are finished generally in accordance with the standard practice, in wainscot and quartered oak, with ash seats and alternate maple and walnut coloured casings, arranged to give a pleasing contrast in appearance from point to point. The ceilings are composed of narrow slotted boards finished to a white enamel surface, this being an innovation which follows upon a series of experiments devoted to an equalisation of the artificial lighting throughout the cars, which has recently been carried out. The actual lamp reflectors are, so far as tramcar lighting is concerned, of new types, which have been made by the Benjamin Electric Company, Limited, to the Council's requirements.

Speaking generally, the majority of the service



Steel Under Frame of L.C.C. Car with Deep Plate Side Girders.

fittings provided on the car bodies are similar to those previously used, the principal modifications being in connection with the steps and lifeguards, which are combined together in a design produced by the rolling stock engineer, Mr. W. E. Ireland, to give the advantages in the case of the guards of both side and front operation, together with the maximum clearance under the leading platform of the car, when the step is lifted and the guard brought simultaneously into action and positively locked by direct movement of one handle.

The object is to furnish the maximum of protection to passengers and pedestrians. On the front end of each car, according to the particular direction in which it is travelling, the steps and adjacent fittings are lifted so far above the normal position as to give a practically clear way between the front of the vehicle and the picking up or safety tray of the lifeguard, with the exception of the slatted gate swinging screens incidental to the operation thereof, which are now arranged to bring it into use when an obstruction is met with from the end or from either side of the vehicle.

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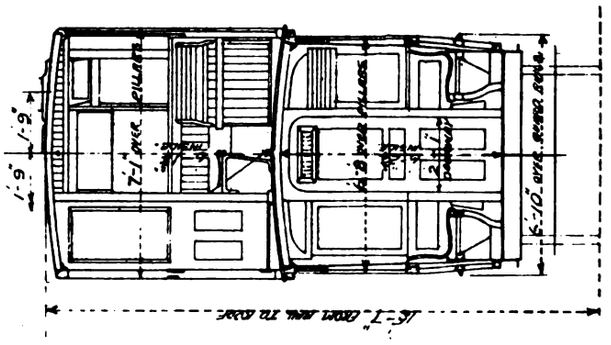
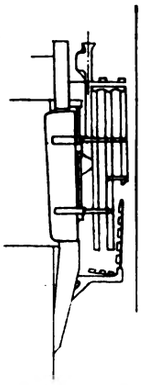
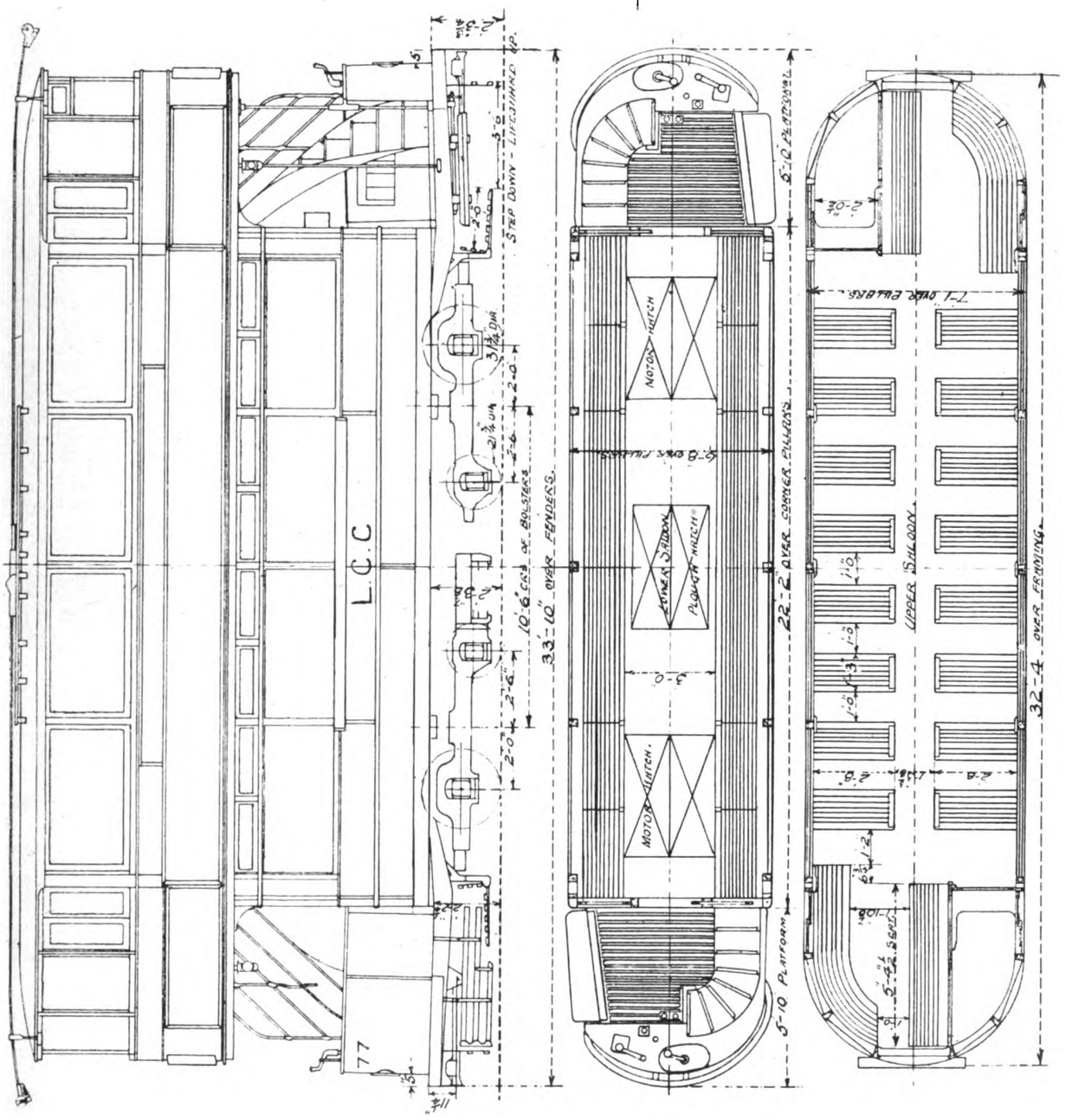




Showing Step Raised and Side Guard in Position.



Elevations and Plans of Upper and Lower Saloons of New Cars for London County Council, constructed by the Brush Electrical Engineering Co., Ltd.

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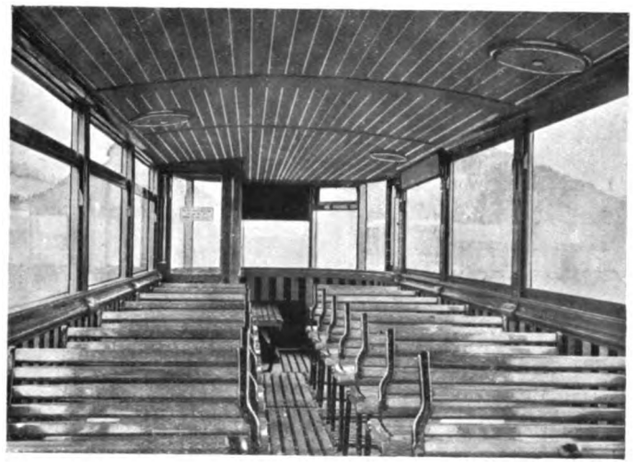
Improvements have been effected in connection with the ventilation of the cars by fitting in the lower saloons a set of sharp angled louvres over each of the end drop windows, so that these can be open, even in bad weather, and assure a regular flow of fresh air through the full length of the vehicle, without the passengers being subjected to direct draughts. For the upper decks, a generally similar effect has been produced by extending the roof side protection or weather strips some inches downward, to cover the



View of Interior of Upper Saloon.

joint line between the moveable windows and the roof rail, and fitting stops to ensure a gap of some three-quarters of an inch being permanently left between the two faces, which is screened from ingress of wet, etc., by the deep weather strip. This ensures an even flow of fresh air across from side to side at the ceiling level. As the upper deck forms the smoking compartment of each car, a number of air outlets or extractors are fixed over the ceiling lamps, these being the points at which heated air and smoke is found in practice most freely to accumulate.

The sanding gear, which is fitted to serve each of the four driving wheels, is arranged to give a direct flow of sand through a vertical pipe at the underside of each hopper, the flow being controlled by a semi-rotary guillotine valve, fixed in the horizontal plane and operated through a rack and pinion by the backward or forward movement of the connecting rod, as actuated by the motorman's foot pedal. The cars are all fitted with coupler gear, with a view to their use for drawing trailer cars.

Hand brakes are fitted on each platform, but not for general use as service brakes, the function of which is performed by the magnetic track brakes, with mechanical wheel block attachments, which have been standardised for many years as the service brakes on all the Council's cars.

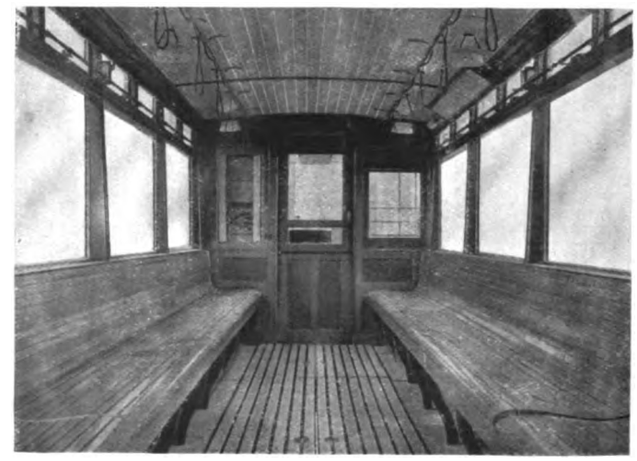
The trucks are of maximum traction type, with swing bolsters, so arranged that approximately 65 per cent. of the total vehicle weight is carried on the driving wheels and 35 per cent. on the trailing or pony wheels. They are constructed principally of steel castings, made in accordance with the Council's specification, to show under test a tensile strength of from 30 to 35 tons per square inch, with an elongation equivalent to 10 per cent. in 2 in. They are tied together transversely by rolled steel transoms and sills of channel section, all secured by machined fitting bolts, to provide for prompt replacement of damaged or worn parts at any time, as requisite.

The driving wheel axles are of steel, finished all over to a parallel diameter of 5 in. over the wheel seatings, and thence reduced to $3\frac{3}{4}$ in. diameter at the journals. The trailing wheel axles are of similar material, but left black, to a diameter of $3\frac{3}{4}$ in. between wheel seats, at which points they are finished to $3\frac{3}{4}$ in. diameter, and thence reduced to 3 in. diameter at the journals.

Tough steel castings are used for the wheel centres in each case, finished respectively to $27\frac{1}{2}$ in. and $17\frac{1}{2}$ in. diameter, to take tyres of high carbon steel, turned to outside diameters on the treads of $31\frac{3}{4}$ in. and $21\frac{3}{4}$ in. respectively, which are heated and shrunk into position on the centres, to which they registered for transverse location by a stepped edge, which is machined on one side and a burr or ring of metal, which is reeled over by a special tool, on the other. A grooved ring is cut in each of the centres, which serves as a datum for locating the device used at regular intervals during the service life of the vehicle for the purpose of determining and recording from time to time the amount of wear or possible distortion in sectional tread outline of each tyre.

Both types of axle boxes are cast from specially tough soft cast iron, and are arranged for oil lubrication in conjunction with packings of wool or worsted waste, the bearings used being of a high-grade anti-friction yellow bronze, each properly fitted to the respective journal. Spring-secured segmental guards, consisting each of several laminations of sheet fibre, are provided at the back of each journal and effectively prevent the ingress of mud, dirt, or water to the boxes. One of each set of trucks is provided with brackets and channels for the special purpose of supporting the plough and collector gear used when travelling over routes constructed on the conduit slot system.

The motors, of which there are two per car, are mounted one on each truck, connected through single reduction gearing on to each of the driving axles.



Interior of Lower Saloon.

They are designed to develop a mechanical output up to 60 H.P. each, to be capable of accelerating the loaded car at a rate of 3 feet per second per second up to a speed of 12 miles per hour, and to give a tractive effort of 1,600 lb. at the periphery of the driving wheels. This increased capacity of the motors, in comparison with those already in use (42 H.P. per motor) has been provided more especially for enabling the cars, on congested routes, when drawing trailers, to maintain

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their respective stations in relation to cars of the older types which are not so employed in drawing trailers. The new car with trailer and the old car without trailer accelerate equally at 2 feet per second per second.

The controllers, with circuit breakers and canopy switches, are all designed to suit the conditions of operation which have to be met in connection with the London tramway undertaking, which is constructed mostly on the underground conduit slot system of traction (on which the polarity of the conductors may be varied from point to point and pole to pole, on any section of track), partly on the ordinary overhead line system and to a small extent in the vicinity of the Greenwich Observatory on the double (insulated return) overhead line system, and also for control of the service (magnetic) brake.

The cars are finished, so far as the external appearance is concerned, in the Council's standard colours of rich crimson lake (Midland red) and cream, with gold letterings and lines, with the exception of such parts as are more especially subject to wear and tear, which are usually picked out in black, to permit of ready renewal when necessary, without interference with the main finish of the vehicle.

With a view to the more rapid reversal of these cars at the outer terminal points of routes which are operated on the overhead system, each car is provided with two trolleys, the arms of which are kept pointing towards opposite ends of the car, so that the conductor, at the end of such a journey, will simply need to pull one trolley down from the wire, and secure it, and release the other into working position, instead of having to swing the arm out across the roadway and guide it back to the other end of his car, across intervening traffic, as is necessitated with the older arrangement. The delivery of the new cars will increase the total number to 1,792, making, with 158 trailer cars, a total (passenger carrying) fleet of 1,950 vehicles.

Bristol Pedestrians to "Keep To The Left."—Bristol Watch Committee has directed pedestrians to keep to the left on the pavements of the city. In a statement by Sir J. Swaish, chairman of the Committee, the fact was noted that many serious accidents occur through pedestrians stepping from the kerb into the roadway without noticing some rapidly overtaking and almost silent motor or other vehicles. In passing from the left of the pavement the pedestrian will have full opportunity of noticing oncoming vehicles.

ONE-MAN TRAMCAR IN LONDON.

INTERESTING EXPERIMENT ON SUBURBAN ROUTE.

If the amount of interest which has been aroused by the introduction on the London United Tramways at Kingston of a one-man safety car is to be any criterion of its general popularity, the success of such a type of vehicle is assured. Mr. C. J. Spencer, the general manager, has rendered a notable service to the development of the one-man car principle in launching this experiment, and his efforts to prove the practical utility of one-man operation are being closely watched. The need for an appreciable reduction in working costs is understood to have been partly responsible for the innovation, and judging from the results obtained in the United States from the large number of such cars there used, a material saving should be effected. It was in America that Mr. Spencer gained much of his knowledge of the one-man car, of which he has made a special study. The present vehicle cannot, however, be described as typical of the American type of safety car. The body is a standard single-deck type, reconstructed to the Company's designs, in their own shops, to suit one-man operation. Vestibule fronts have been fitted, and the seating capacity, in the car's new form, is 30.

One-Man Tramway Car—London United Tramways, Ltd.

While driving, the motorman is seated in the body of the car, in a similar manner to the modern cabriolet motor car, with an open railing behind him, as shown in the accompanying photographs. The entrance is fitted with sliding door and folding step, working in conjunction with each other and operated by means of a lever by the driver. An electrical device prevents the car being moved when the door is open. An electrically operated "Automaticket" machine (such as was described in our issues of Jan. 19 last and May 19, 1921), is fitted at each end of the car, by means of which the motorman can issue from one to five tickets of any denomination by pressure of a button. Passengers board and alight at the front end of the car and pay their fares on entering, the rear door being locked. Improved methods of issuing tickets so as to operate with one roll of tickets and to deal with any length of route have been considered and

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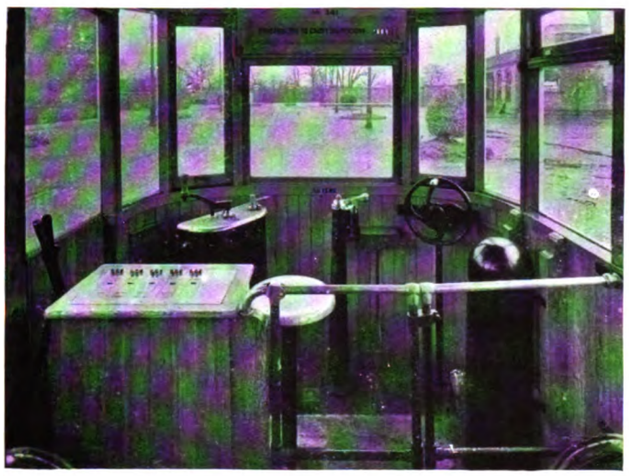
a scheme evolved with which it is hoped to experiment at an early date. Mechanical means of giving change are also embodied in this scheme.

The body is mounted on a single Brush truck of 8 ft. 6 in. wheel base, with flexible axle suspension. The wheels are of 33 in. diameter, and the car is fitted with the Spencer-Dawson hydraulic track brake.



Motorman's Compartment of One-Man Car.

This is an invention of Mr. Spencer, which he introduced on the Bradford Corporation system when he was manager there, to ensure additional safety on the steep inclines which are to be met with in that city. In order, however, to provide the necessary "deadman" handle feature, so that the car is automatically stopped in the event of sudden illness of the motorman, the brake handle is arranged to be held normally in the "on" position by means of a spring, and in this position power is cut off from the controller.

Passenger Entering One-Man Tramway Car.

To save the motorman having to take the pull of the spring in the "off" position, the handle is fitted with a light spring catch held in position by the weight of his hand, but the handle is immediately released when pressure is removed. The ordinary rheostatic and hand brakes are also installed. In order to allow of tripping circuits for the doors and deadman's handles, the controller has been arranged in conjunction with a contactor which is carried on the roof of the car. The pick-up coil of the contactor operates with one ampere and is closed on the first notch, but will not close or remain open on any notch if the circuit is broken at either door switch or brake handle. A "Road Guide" device, supplied by Messrs. Road

Motorman of One-Man Car Issuing Ticket to Passenger.

Guides, Limited, is fitted on the car. This is driven off one of the axles and automatically shows passengers the position of the car at any moment and the route half a mile ahead.

As will be seen from the illustrations, the exterior of the car has a pleasant appearance. A strong headlight is mounted on the end of the roof, above the motorman's compartment, and is so inclined that its rays bear down on the track. Notices painted on the panels adjoining the doors advise intending passengers to "Please have exact fare ready" and "Please pay as you enter car." A rather ornamental poster, mounted on a narrow board extending along the greater part of the edge of the roof, bears the motto "Always be careful," flanked by the familiar "Safety First" signs. In addition to the ventilation afforded by the small hinged windows above the main side windows, fresh air may enter through an adjustable screen, opening outwards, in the front of the driver's vestibule.

JUBILEE OF DUBLIN TRAMWAYS.

A NOTEWORTHY TRIBUTE TO THE SYSTEM.

February 1 marked the jubilee of the inauguration, by the Dublin United Tramways Company, of the tramway from Nelson's Pillar to Rathmines and Terenure. The *Irish Independent*, commenting on the anniversary, says—

"One of the greatest benefits bestowed on Dublin in the last half-century was the introduction of the tramway system. It completely revolutionised locomotion and travelling in the city, and gave the long-needed impetus to the opening-up of the suburban areas as residential quarters. The linking-up of these districts (Rathmines and Terenure) with Dublin was the prelude to a period of remarkable activity in the building trade, and thousands of attractive and commodious houses owe their erection to the enterprise of the tramway promoters.

"For many years the tramway cars were drawn by horses, but finally electricity was utilised, and in May, 1906, the electric tramway from Haddington Road to Dalkey was formally opened by the Lord Mayor of Dublin, the Right Hon. R. F. McCoy. The electrification of the whole Dublin tramway system followed, with results that are known to every citizen."

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SIX-WHEELED RAILLESS OMNIBUS AT BRADFORD.

The general manager of Bradford Corporation Tramways, Mr. R. H. Wilkinson, has carried a step further his activities in developing the railless trolley omnibus by designing the six-wheeled vehicle shown in the accompanying illustrations. Several types of trolley omnibuses have, in fact, been constructed to his designs for the Bradford system, and it will be recalled that Mr. Wilkinson was responsible for the production of the first double-deck type to be used in this country, as illustrated in our issue of November 18, 1920. Two later railless models of his were described and illustrated in our issue of April 21 last year—a "one-man" vehicle and a six-wheeled, double-deck omnibus.

The vehicle here pictured has seating capacity for 59 persons. The front portion of the upper deck is not at present utilised for passengers, but it probably will be after the omnibus has been in service for some time, in which case its seating capacity will be increased by at least six. The vehicle will very shortly be going into service, the delay (at the time of writing) being caused by the non-delivery of the motor and controller. The omnibus has a single motor drive of 70 H.P. with a foot-operated controller. There are three methods of braking, as follows—

(1) A brake operated by the foot on to the counter-shaft and so to the back wheels.
(2) By side lever operated by hand, which brakes both the back wheels and the rear front wheels.
(3) The ordinary electric brake, operated through the controller.

The wheels are 3 ft. 4 in. in diameter, the back wheels being fitted with twin solid tyres. Fifty per cent. of the weight of the vehicle is on the back axle, and the remaining 50 per cent. is distributed equally between the two front axles. The vehicle weighs seven tons complete (without passengers), and the weight is distributed equally over eight tyres. The front axles are fixed, and are not arranged on the bogey principle. The wheels alone move and are steerable, the four front wheels being connected by the one steering shaft. These wheels are mounted on stub axles in the usual manner. The somewhat similar type of vehicle with four wheels, which has been in operation since November 6, 1920, has run approximately 40,000 miles.

The Bradford Corporation are promoting, in the present Parliamentary session, an order to run trolley omnibuses over a number of their tramway routes, having in view extensions outside the city. The object is to enable a through service to be given from the centre of city to out districts, without breaking the journey.

Six-Wheeled Railless Trolley Omnibus—Bradford Corporation Tramways.

SCOTTISH TRAMWAYS ASSOCIATION.

Further steps have now been taken in the formation of the Scottish Tramways Association, to which reference was made in our issue of January 7. Following the meeting there referred to, a second conference took place last week in Dowell's Rooms, Edinburgh, when Mr. L. MacKinnon (deputy general manager, Glasgow Corporation tramways), presided in the absence of Mr. J. Dalrymple. A draft constitution was prepared, and other arrangements made for a further meeting to be held in Edinburgh. It is intended to hold periodical meetings for the consideration of matters relating to Scottish tramways in general.

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THE "BURNLEY" TRUCK.

The "Burnley" truck, which is shown in the accompanying illustrations, was produced at Burnley by Mr. Henry Mozley, general manager of the Burnley Corporation Tramways, and his staff. The truck was specially designed for use on heavy gradients, and it has many useful features. It was first used in 1910, and has been in service for many years. It may therefore be said to have stood the test of time, and it has been found very satisfactory as to smooth running and in the way it has withstood the somewhat exacting conditions on steep and worn tracks. On one route on which the large single-deck cars run there are gradients of 1 in 10, and on another there is a long length as steep as 1 in 11·9.

The principal disadvantage of the maximum traction type of truck is the difficulty of braking effectively very high speeds, and generally it may be said that the ordinary types do not accelerate nearly as well as the four-wheel car. For this reason the ordinary maximum traction truck is not so suitable for use on considerable gradients as the four-wheel car. The maximum traction truck of the Burnley design, however, lends itself very favourably to the use of the Maley electro-mechanical rail brake, which is manufactured by the Electro-Mechanical Brake Company, Limited, of West Bromwich, who have introduced several improvements in the Burnley design of truck. The Birmingham Corporation Tramways have in service 125 cars equipped with the Burnley type of truck and the Maley electro-mechanical rail brake. These cars, with passengers, weigh as much as 19 tons, and are run at very high speeds, probably as high as any in the country, on gradients as steep as 1 in 13, and they have been doing this service for over seven years. The weight of the car body is carried over the centre of the driving axle, so that as much as 80 per cent. of the car weight is utilised for adhesive purposes in accelerating or braking. The acceleration even on greasy rails is practically as good as that obtainable from an ordinary four-wheel car. It might be thought that owing to the large proportion of weight carried by the driving wheels there would be a tendency to skid, with consequent flattening of the pony wheels when using the hand brake, but this is entirely avoided by a new design of compensating link which has proved very successful.

The mechanical details of the truck have been carefully worked out. The main crossbar is spigotted into the side frames, ensuring accurate assembly and maintenance of alignment under all conditions. All pins are case-hardened 1-16th in. deep, and all holes are bushed. The king pin, through which the drive of the truck is transmitted to the car body, is carried in a phosphor bronze bearing, which in turn fits into a radiussed frame. This allows the car to pass over the worst hog-back bridge or track without imparting any bending strain to the king pin or transmitting shock to the car body. The centre pin is carried by a stiff cast-steel bracket which is placed exactly over the centre of the driving axle, and is part of the truck and not on the car under-frame. Owing to this arrangement the driving wheels have no lateral motion in relation to the car body. This tends to keep down flange wear and it provides a central drive, the axles always being approximately radial to the curve. The centre pin engages in a die sliding in a box and controlled by a spring. One inch of movement on each side of the centre is allowed. The adjustment is such that the riding of the car is similar to one mounted on a swing bolster. The body is carried on spring-mounted saddles on each side of the frame, fitted with wearing plates sliding on grooved steel angles bolted to the side sills of the car under-frame. The pony wheels have a wide range of travel under the sills of the car, but, owing to the comparatively small weight they carry and the great leverage they possess, the swivelling of the truck is very easy and the flanges keep in good condition. A little extra pressure is added for curves of small radius, and the ease and freedom with which these trucks take the car over curves with a radius of 29 ft. is noteworthy. The body really floats on the truck, and this accounts for the exceptionally smooth running.

The renewable horn plates are of channel section, and much more substantial than is generally the case. All brake spring nuts are self-locking; the driving wheel axle box keeps are bolted up from the under side, forming an integral part of the frame, a method of construction which imparts great additional strength.

The results obtained from the Birmingham cars fitted with this equipment have been excellent. Maintenance costs, we understand, are actually less than on the four-wheel cars, although during the war these heavy cars running on busy routes were handled in many cases by temporary drivers, and owing to the shortage of men the maintenance of the trucks could not be kept up to peace time standards. When the traffic calls for large cars to operate at high speeds on busy routes, there is no doubt that this combination of trucks and brakes will give very satisfactory results, and this on gradients for which ordinary maximum traction trucks are unsuitable owing to low adhesion. If desired, the trucks can be supplied without the Maley electro-mechanical rail brake.

On narrow gauge lines the bogie car is practically the only economical type of car, owing to the small carrying capacity of the four-wheel car. Apart from the financial side of the question, the end oscillation of four-wheel cars on narrow gauge lines is most objectionable, and up to the present no permanent cure has been discovered for it. This end oscillation, or "tail wagging" as it is sometimes called, is also met on standard gauge lines, but it is not so pronounced, of course, as on the narrow gauge. Obviously, as the bogie truck eliminates end oscilliation, it is an additional argument in its favour. For single-deck cars the Electro Mechanical Brake Company, Limited, supply the "Burnley" truck in a lighter design.

The findings of the "Corrugation" Committee raise an important objection to "maximum traction" trucks, inasmuch that the pony wheels promote corrugation because although only carrying a minor part of the load, owing to the reduction in their diameter, the rails are more heavily stressed than in the case of the driving wheels. This criticism will not apply to the "Burnley" truck, where the weight carried by the pony wheels is so much less than is carried on the pony wheels of maximum traction trucks of ordinary design.

Sequel to Burton Tramcar Mishap.—Alluding to the recent overturning of a Burton-on-Trent tramcar, in consequence of a broken axle, Alderman J. S. Rowland (chairman of the Tramway Committee) informed the Council that the numerous level-crossings imposed a greater strain than on most systems. Experiments were being made, and the committee were prepared to adopt the very best axle obtainable and substitute it throughout the cars, whatever the expense might be.

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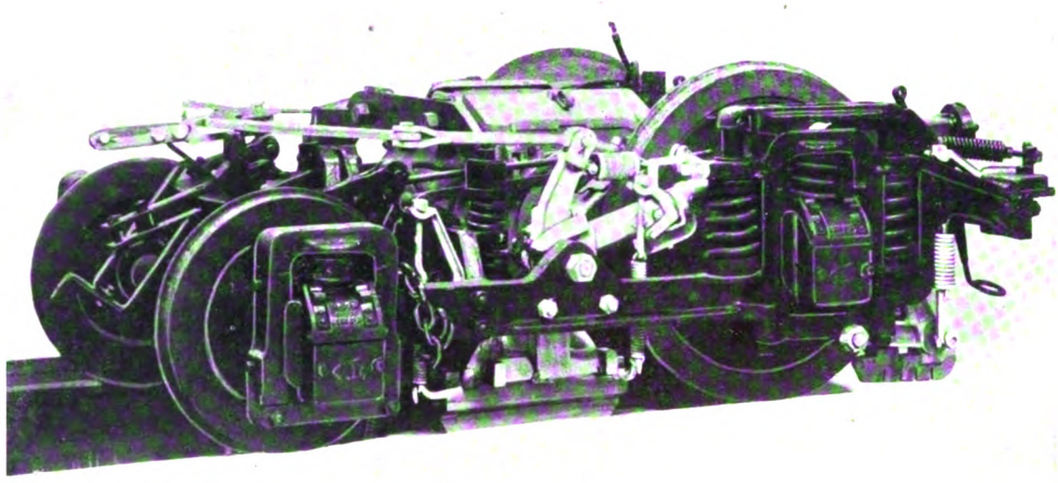
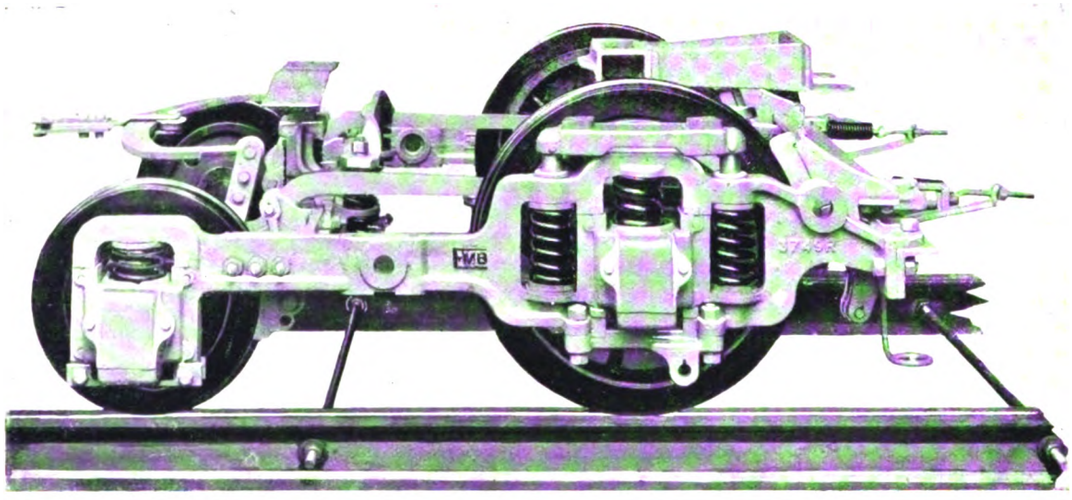
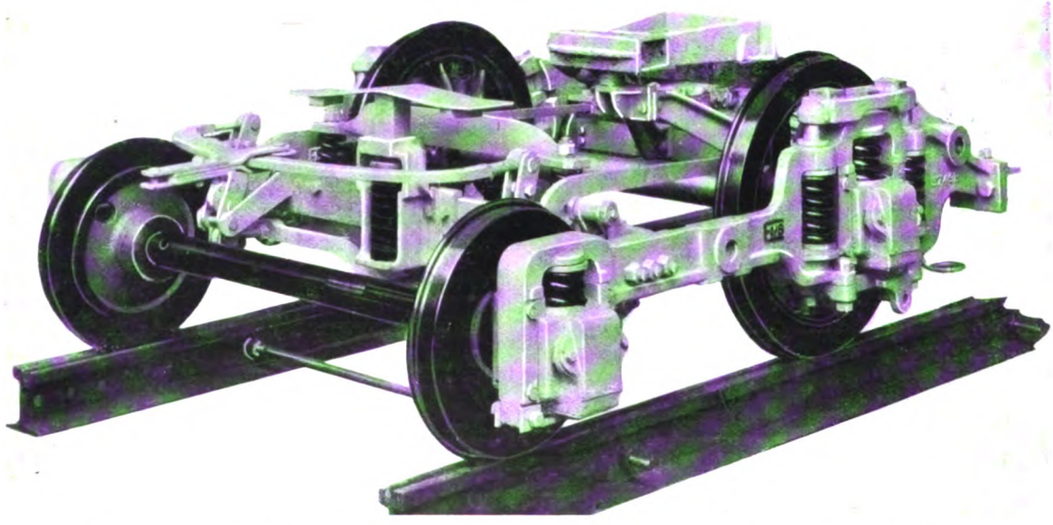


"Burnley" Bogie Truck (Brush Electrical Engineering Co.'s Manufacture) Equipped with Electro-Mechanical Rail Brakes by the Electro-Mechanical Brake Co., Ltd.



Side View of "Burnley" Bogie Truck.



Views of the "Burnley" Bogie Truck Manufactured by the Electro-Mechanical Brake Co., Ltd.

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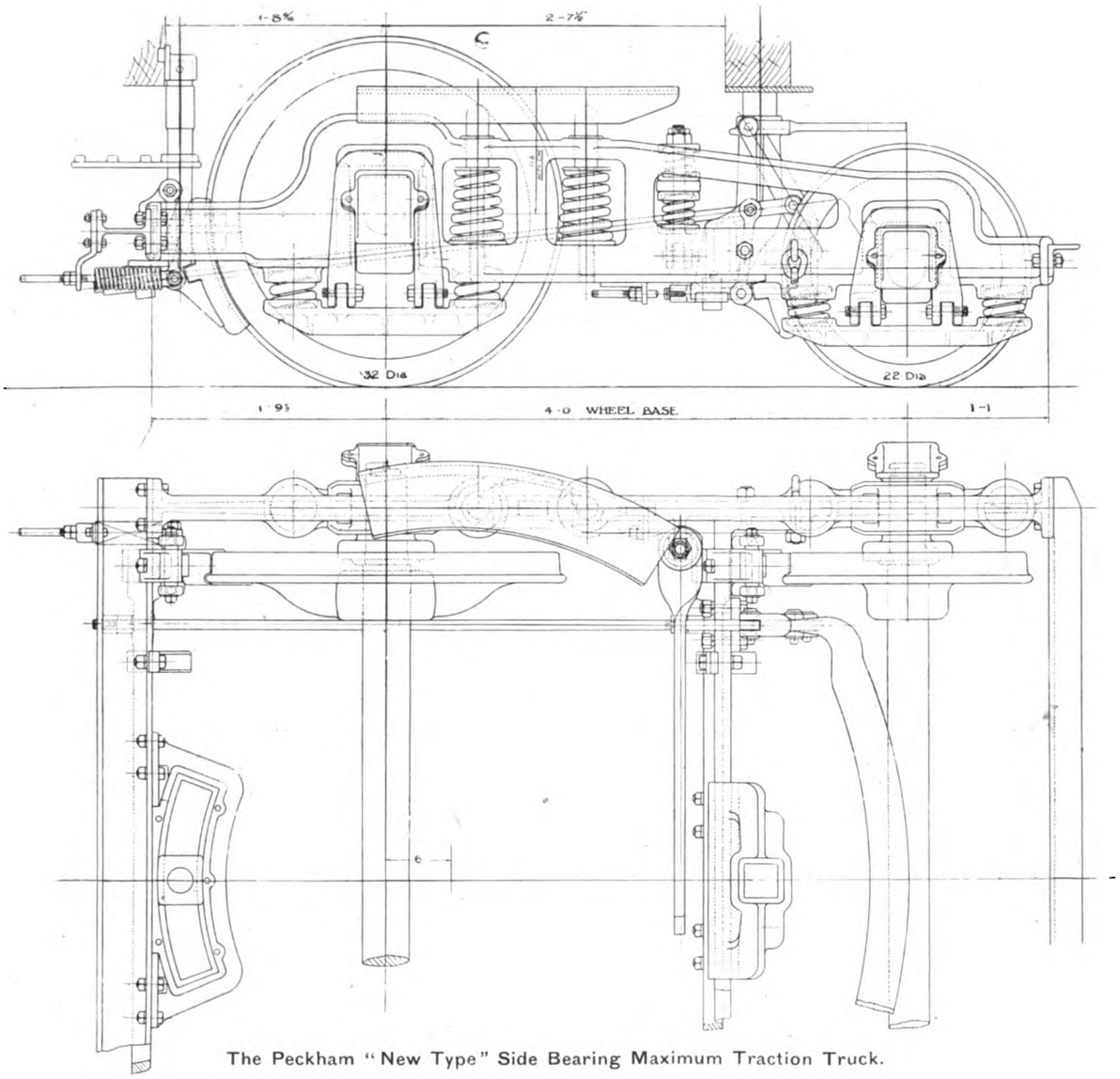
THE PECKHAM "NEW TYPE" SIDE BEARING MAXIMUM TRACTION TRUCK.

Many types of maximum traction trucks have been designed and tested during the last 25 years with varying success. The two chief types now in general use are of the swing bolster and the side bearing design. With a view to obtaining a perfect riding car, The Peckham Truck and Engineering Company, Limited, of Audrey House, Ely Place, Holborn, London, E.C.1, collaborating closely with the Brush Electrical Engineering Company, of Loughborough, have designed the truck shown in the accompanying drawings, and it embodies the features of both types mentioned above but with many improvements.

This truck, which will be known as the Peckham patent new type side-bearing maximum traction truck (P. 26) is of the side bearing type as far as the mounting of the car body is concerned, but with the Peckham patent pendulum gear mounted on each axle, lateral movement is provided which gives the same flexible movement to the car body as the swing bolster type of truck. It possesses, however, this considerable advantage, viz., that each pair of wheels is able to get out of line in relation to and independent of each other, thereby allowing a much easier movement when going round curves and into loops, which not only means a great reduction of current consumption, but also a considerable saving in wheel tyre wear and also adds not a little to the comfort of the passengers.

To the springing of this truck special attention has been given and considerable improvements have been effected which will give a much better riding car. The axlebox springs have been transferred from the top of the axlebox and supported on either side of the frame yoke of the driving wheel. The motor suspension is of the Peckham flexible type to allow the motors to float with the axles, thereby considerably reducing the wear of the bearings and equipment generally.



The Peckham "New Type" Side Bearing Maximum Traction Truck.

The brake gear is designed so that the line of application is in line with the centres of supports, and to overcome the existing troubles now experienced on this type of truck, and can be arranged to work in conjunction with magnetic track brakes.

The side frames, it will be noted, are of cast steel, and whilst being of a very light section are exceptionally strong, and are braced at the driving end with a cross-bar of H section to take the rack and twisting move-

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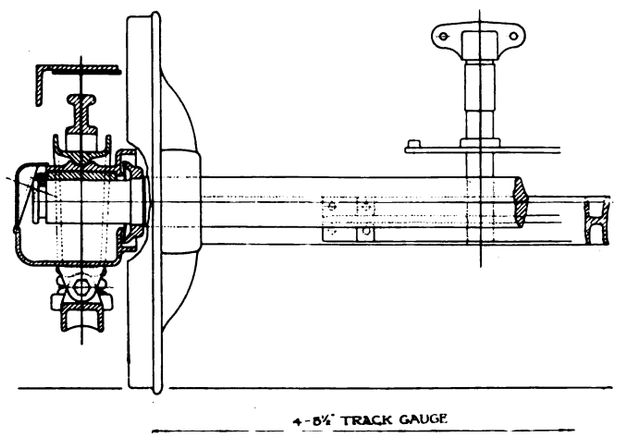
ment from the ring pin, a detail which has given considerable trouble on the existing types of trucks. This truck is considerably lighter than the swing bolster type and permits of easy access to the magnetic track brakes which are usually fitted to this type of truck. It also allows the motors to be suspended inside the truck instead of on the outside, as is the case on the swing bolster type.

The Peckham Truck and Engineering Company, Limited, are prepared to give a practical demonstration of this new type of truck and will be pleased to supply



sample sets for this purpose on reasonable terms which can be obtained on application to them.

They have asked us to mention that the pendulum gears, which are in use on so many tramways, and are giving entire satisfaction, can be applied to all makes of existing trucks.

MOTOR TOWER REPAIR WAGON LICENCES.

A CURIOUS LICENSING POINT.

A case of particular interest to tramway authorities was heard at Falkirk Sheriff Court on February 1. The Falkirk and District Tramways Company were charged at the instance of Stirling County Council with having on June 6, 1921, used a motor tower repair wagon for which a licence was not in force. Stirling County Council maintained that the duty payable on the vehicle was £25, whilst respondents contended that under the terms of the schedule attached to the Finance Act they were not bound to pay more than 5s. duty, as the vehicle came under the category of a tractor carrying only its own gear and used solely for repairs and not for commercial purposes.

Mr. D. Hays, general manager and engineer of the tramways company, admitted that the company had no licence at all for the vehicle. He also admitted that through an oversight the 5s. duty which was due had not been paid at the time. In view, however, of the fact that the County Council demanded £25 for a licence, the case was considered one of considerable importance, and pending a decision no tender was made at all. Glasgow Corporation, who possessed several vehicles similar to the one owned by the Falkirk Company, had refused to pay the higher licence.

The Procurator-Fiscal said the case seemed to depend entirely on the interpretation of the Finance Act and the Roads Act of 1920. He quoted several passages to prove that the vehicle was one for which a £25 licence should be taken out. Sheriff Robertson said the question was one for the High Court of Exchequer, and should be settled by judgment there. This was a question of general interest to the Corporation of Glasgow and to County Councils throughout the country where there were tramways, and it would be far better to have the question settled by a special case to the High Court. There was no question, however, that the respondents ought to have had a licence, and he thought a penalty of £2 2s. would meet the character of the offence.

Reductions in Tramway Employees' Wages were made at the first full pay period in February as follows—Employees aged 18 and over, 3s. per week (making a total reduction since August last of 8s.); employees under 18 years of age, 1s. 6d. per week (total reduction since August last of 4s.).

SOUTH AFRICAN RAILWAY ELECTRIFICATION.

IMPORTANT CONTRACT FOR A BRITISH FIRM.

The Metropolitan-Vickers Electrical Company, Limited, of Trafford Park, Manchester, have been successful, we are informed, in securing the first order placed in connection with the electrification of the Union of South Africa railways. The section on which work is to be started is that from Glencoe to Maritzburg on the Natal line, and the amount of the present order will be between £750,000 and £1,000,000.

It was before the war that suggestions were first made for extensive conversion to electrical operation of the South African railways. In June, 1919, Messrs. Merz & McLellan, consulting engineers, submitted a comprehensive report covering electrification schemes for—(1) Capetown to Touws River and Capetown suburban lines; (2) Glencoe-Durban and Glencoe-Vryheid East; (3) Witbank-Germiston-Randfontein and Witbank-Komatipoort. From this report it was apparent that the most pressing case was the Glencoe-Durban section, and particularly the 120 mile Glencoe-Maritzburg, as beyond Maritzburg conditions had been made easier by extensive deviations.

Important economies will be effected by the introduction of electric locomotives. Assuming a loaded traffic of 20,000 tons per day in one direction on a 1 per cent. up grade, 11 electric trains (each of about 1,800 tons) would be capable of this duty, for which 14 steam trains would have to be employed. A valuable feature of electrification in these hilly districts will be the characteristic of regenerative braking on descending grades, obviating all the wear and tear on wheels and brake shoes inevitable with steam traction. This electrification will be one of the most important yet undertaken, comparing in this respect with the Chicago, Milwaukee and St. Paul railroad, the locomotives being designed to take a continuous current supply of energy at a pressure of 3,000 volts on the trolley line.

It is understood that at least 70 electric locomotives each equipped with four motors, will be required from the Metropolitan-Vickers Company. The construction of these, and of the necessary control gear, is expected to afford considerable employment at Sheffield and Trafford Park when the work is fully in hand. That the first order placed for this important contract has been secured by a British firm in face of keen European and American competition, is a matter for congratulation.

LONDON AND BRIGHTON RAILWAY ELECTRIFICATION.

A contract in connection with the extension of the electrification of the London, Brighton and South Coast Railway has been placed with the General Electric Co. Ltd., who will undertake the necessary manufacture at their Witton Engineering Works, Birmingham. Work will begin within the next few months, and will be completed within twelve months. It is understood that the contract, which is one of several that will probably arise out of the grouping system consequent upon last year's Railway Act, is for the provision of the whole of the electrical equipment for twelve additional motor coaches, each of 1,000 h.p., to enable the section of the line from Balham through Thornton Heath to Selhurst and West Croydon to be operated electrically. The equipment is for employment with single-phase alternating current.

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THE EDITOR will be glad to consider articles by experts. All information of a practical character relating particularly to the engineering and operating branches of transportation will receive prompt attention. Original illustrations will also be welcome.

LONDON, FEBRUARY 16, 1922.

Car Improvements. Considering the large number of new cars put into service since the close of the war disappointment may be felt that in only comparatively few towns do the bodies show improvements. The leading exception, of course, is Newcastle-on-Tyne, with its front exit and interior staircase cars. Belfast and Salford are successfully experimenting, the former with the front exit and the latter with front exit and inside staircase, as an aid to speedy working and lessened liability to passengers' accidents. Considerable advances are about to be entered upon at Edinburgh in connection with the electrification of the cable tramways. In taking the advice of their general manager to make the change, the City Council will effect an economy that cannot be properly expressed in monetary terms. One, among several, instances in which the city will gain from Mr. Pilcher's experience at Aberdeen and elsewhere is in the utilisation of existing cars, after effecting notable improvements in the bodies and fitting them with new trucks. Briefly expressed, the main requirement is governed by the fact that 25 per cent. of the traffic is at penny fares, thus rendering unnecessary bogey cars of maximum seating capacity. Experiments made by the management with each type of car have shown, as was to be expected, a saving of some 20 per cent. in power consumption for the single truck car. The large amount of short distance traffic is also a reason for effecting improved means of entering and leaving. This is to be accomplished by giving existing and new bodies a front exit. Edinburgh will thus set an example that will not be lost upon its numerous summer visitors. Another improvement will be the fitting of vestibule ends, as is the case in a number of northern towns. With the means that are now available for keeping the glass free from moisture, the enclosing of the motorman entails but little risk. The pros and cons of the vestibule will, however, shortly be made the subject of a report from a committee of the Municipal Tramways Association. One argument in its favour can be supplied by Mr. Pilcher, who has found that with the non-protected cable car most of the accidents in which drivers are involved occur during rain, exposure to which renders them less alert and more liable to make mistakes. Coming south, satisfaction may be found in the fact that the new cars now being delivered to the London County Council, besides being fitted with more powerful motors, are better lighted and ventilated. The weather-protected air outlets to the top covers are long overdue. It is to be hoped that the device will avert the need partly to open the windows in bad weather, with consequent lowering of temperature and wetting of the seats.

Economy in Tramway Operation. Alike in the affairs of the State and in municipal and private business life, economy is the most urgent need of the day. Nature for a year past has been impressing that lesson on every individual in the matter of water supply. Now the railway companies, as a matter of self-preservation, are insisting that their employees should realise the need for economising in the use of the various materials handled in their daily labour. Mr. A. J. Hill, chief locomotive engineer of the G.E.R., led off by urging firemen to use four shovel loads of coal per mile instead of five, thus saving £312,000 per annum, or more than half of the total amount spent on coal

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before the war. Almost concurrently, Mr. Felix Pole, general manager of the Great Western Railway, issued an "Economy and Co-operation" circular, in which he stated that if every employee economised in the use of stores, &c., to the extent of sixpence per week, there would be a yearly saving of over £100,000. The appeal has been met with goodwill on the part of the employees, and in the Great Western Company's Magazine Mr. Pole says that if the tenor of the communications received are an earnest of the practical interest engendered, the success of the movement is assured. Tramway managements long ago devoted anxious attention to economy, but there is no reason why their efforts should not be extended and emphasised. In the case of the London County Council tramways department, effective steps for securing economy were taken as far back as the last stage of the war. Mr. Fell, the general manager, was inspired to action at that time by the material which, for courtesy's sake, was termed "coal." What was done in those trying days in the power-house led Mr. Fell to issue a pamphlet indicating how many employees, including the car crews, could assist in economical operation. So impressed were the County Council with Mr. Fell's practical advice, that they ordered the pamphlet to be printed for circulation among the employees. Since then the management has made a most effective bid towards a great yearly saving by asking the licensing authority at Scotland Yard to allow the annual painting of the cars to take place only when equipment needs overhauling. That the request is not unreasonable is shown by provincial experience. With regard to the various ways in which tramway operation costs can be reduced with the co-operation of all ranks, it would perhaps assist the industry if managers sent to us an account of the steps they have already taken to reduce expenditure other than by wage reductions. As respects the latter, it is imperative that all waste time should be cut out. The undertakings cannot in the present conditions pay for services not rendered, and the employees will best serve their own interests by recognising the need of the employers to increase economic efficiency.

The One-Man Car in London. A noteworthy event during the past month has been the experimental running of a one-man car on the London United Tramways at Kingston-upon-Thames. The event attracted considerable attention in the press, and it is well that the advantages —so often emphasised in these pages—of cars of this and similar types should be made widely known. Though the experiment is only tentative, it is certainly a hopeful one, and tramway managers generally will be interested to hear of the results obtained. The car is by no means identical with the "Birney safety car" so widely used in America, though it forms some approximation to it. The method of its operation is, of course, similar to those of the American cars, but the vehicle itself is much heavier than is usual for one of this class, weighing unloaded about 12 tons. The motors are also heavier and larger than a one-man car usually calls for although their rating is only about 25 H.P. each. Apart from constructional details, however, the advantages which accrue from this system of operation are undoubted. The success of the one-man car throughout the United States has been remarkable. In cases where a street railway undertaking has had to encounter keen competition from other forms of transport—chiefly from the "jitney," as the private motor omnibus is called—or has suffered heavily from high operating costs, the safety car has often been the means of finding a way out of the difficulty. The causes are readily apparent. A marked economy is effected by the use of such cars during the less busy hours, when the volume of traffic does not merit the running of large, double-deck vehicles. The reduction of working expenses is accompanied by a more frequent and faster service, and what is even more desirable, accidents are practically eliminated. Mr. Spencer has studied the subject closely and it will be remembered that at the annual congress of the Tramways and Light Railways Association, held in London in 1920, he recorded his impressions of a visit to America the previous autumn. He was then much impressed with one-man operation, and noted that some car-building firms had designed "most ingenious cars," carrying from 30 to 40 passengers. These were being supplied in large quantities not only to small tramways with light

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traffic, but even for use on fairly heavy traffic routes. Though Mr. Spencer observed that the cost of operation was about half that of an ordinary heavy car, it is not to be supposed that the same ratio would apply in this country. It has been estimated, however, that platform costs can be reduced by nearly half, a factor which in itself should do much to popularise the one-man vehicle here. Fare collection constitutes a much more difficult problem in this country than across the Atlantic, where the simpler fare system facilitates matters to a great extent. The simpler the method which is decided upon, the greater will be the effectiveness of one-man operation. The difficulty is not insuperable, as is proved by the fact that Mr. Pringle, general manager of the Victoria (Australia) Electric Supply Company, was able to introduce a successful method at Ballarat and Bendigo. Apprehension is sometimes felt by managers in this country that difficulties with the operating staff may arise over the introduction of the one-man car. There is no reason why this should be so. In America, owners, the public, and the employees alike recognise the vehicle as a labour-saving medium, which by tending to make the tramway undertaking more profitable, will eventually react to the benefit of the employees as a body. The extent of staff reductions entailed by the change is far less formidable than might appear, for the general experience is that more cars are required, affording a considerably improved headway. The men can hardly fail to realise that, after all, efficient and economical service for the public must be the first consideration of any management.

The Trolley Wire in Princes Street

The Dean of York is much troubled by the prospect of overhead trolley equipment being erected in Princes Street, Edinburgh, to the detriment of the view associated with this famous thoroughfare, and has made his protest in a letter to *The Times*. He is not alone, of course, in the opinion he puts forward, for literally scores of letters have appeared in the Scottish press in favour of and against what is now the twice-affirmed decision of the Town Council. To the views of responsible spokesmen resident in Edinburgh due attention should, of course, be paid when dealing with the affairs of their own city. But the Dean of York confesses that he is "merely an occasional visitor, with a great love of Scotland and of romantic beauty." While these latter characteristics are shared by many others, they assuredly will not solve Edinburgh's pressing transport problem, nor help the citizens to get quickly to business and quickly home again. May it not be presumed that the Edinburgh Town Council and the municipal electorate are quite capable of looking after their own interests without the unsought advice of those who do not even live within their own borders? The Dean is, however, not satisfied with merely his own interference; he appeals to "lovers of beauty throughout the kingdom to save Princes Street." It is unfortunate that with the Dean's great love for Scotland he should not also have some respect for the sound judgment of the inhabitants in domestic affairs, without rallying the rest of the kingdom to their aid. There is another phrase in his letter which goes further to discountenance the Dean's status as an adviser on Edinburgh tramway matters. "I hope I am mistaken, but it is commonly reported," his letter opens, "that the Edinburgh city authorities contemplate," etc., and he proceeds to refer to the conversion of the tramways to electric traction. So that the Dean has apparently not even read any of the numerous debates and official reports which have now firmly convinced the Town Council that the overhead system for Princes Street would best serve the interests of Edinburgh. If this represents the degree of acquaintance on which the Dean bases his views on local government, then it were well that the Edinburgh authorities keep their own counsel—as we are sure they will.

PASSING STATIONARY TRAMCARS.

PROPOSED NEW BY-LAW AT ABERDEEN.

Definite steps have now been taken at Aberdeen with the object of reducing the danger arising from vehicles passing on the near side of stationary tramway cars. Councillor Wright, who has taken a leading part in the agitation for a new by-law, was invited to a meeting of magistrates, on January 31, to consider the framing of a new by-law under the Corporation Tramways Act, 1908. A resolution was carried to the effect that by-laws should be passed requiring all vehicles, including cycles and motor cycles, to move at a dead slow pace when passing a stationary tramcar while passengers were leaving or boarding.

Commenting on this decision, the *Aberdeen Daily Journal* refers to it as "a compromise which is not regarded as satisfactory by those who have been taking an interest in Councillor Wright's efforts to safeguard the public who use the tramcars. The Councillor's proposal was that a by-law similar to that adopted in Glasgow should be introduced in Aberdeen, compelling motor cars and other vehicles coming behind a tramcar standing at a stopping-place, to come to a dead stop. The magistrate's compromise, allowing vehicles to go through groups of tramway passengers, leaving or boarding tramcars, at a walking pace, is regarded by Councillor Wright as an aggravation of the evil. . . . His contention is that under the proposed by-law there is no protection for the tramway passengers, as now, when an accident occurs, the driver of the vehicle will plead that he was passing the stationary tramcar at a walking pace, and, therefore, conforming to the by-law.

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CORRESPONDENCE.

RAIL CORRUGATION.

A SUGGESTED EXPLANATION.

To the Editor of "THE TRAMWAY AND RAILWAY WORLD."

Sir,—When I received the proceedings of the Municipal Tramways Association and saw that sub-committee No. 1 of the Municipal Tramways Association had presented their final report on Corrugation, I hastened to turn to it with the full assurance that at long last I should find that the troubles of the tramways engineer were at an end, or at least alleviated. But alas! what did I find? I found what one is almost tempted to describe as an academic treatise by a learned professor on certain experiments carried out with meticulous exactitude in his laboratory.

It must be said, however, that apparently the terms of reference of this sub-committee were limited to "the analysis and investigation of the question of vibration of rails and foundations." But even so, I cannot see that the conclusions arrived at help the tramways engineer in the slightest degree—nor advance the solution of the question one iota. Here we have the experiment carried out under conditions that are entirely foreign to the practical every-day operation of tramways. The rail "is always dry and only slightly dusty," "maximum traction bogie trucks" only were used, and these of "42 H.P." The rail is supported "by fixing wide bulb angle iron to both sides by bolts every 12 inches," and conduit construction only is experimented with, and with single-deck cars.

How many tramways have all or even any of these conditions?

The conclusions arrived at by the sub-committee in 1914, which are apparently now confirmed, throw no practical light upon the question, and add hardly anything to what has been known for many years. Take, for instance, conclusion No. 8. "That corrugation is removed at and near stopping-places by magnetic brakes!"

The final conclusion arrived at is "That corrugation is inseparable from the action of the heavily loaded wheels rolling along the surface of the tread of rails, and that this rolling originates the corrugation, etc., etc.

Then why are not all rails corrugated? What is the explanation of the fact that frequently—one might even say generally—the corrugation only appears on isolated portions of track, for perhaps one or two rail lengths only, and even then not on opposite rails?

Now the more I look into this question the more I am convinced that the root of the trouble is inherent in the rail itself, and in this connection I would like to remind you that in 1906, nearly 16 years ago, I put forward a theory which appeared in the form of letters to the *Electrical Review*, and which I brought to the attention of the then hon. secretary of the Municipal Tramways Association in 1909. I have not been able further to investigate this theory, but it is an interesting one, and perhaps you would find space to reprint the letters to the *Electrical Review* of November 6 and 19, 1906.

Incidentally I may add that Mr. A. L. C. Fell, in his able and comprehensive paper to the sixth conference of the Municipal Tramways Association of 1907, supported my theory in a very marked degree, when he said "he still considered that the 'original sin' is produced when the rails are rolled."

Yours faithfully,

L. E. HARVEY,
Tramways Manager and Engineer.

Ilford Urban District Council,
Tramways Department,
Ley Street, Ilford, Essex, February 1, 1922

The letters referred to above are as follows—

I have just come across a short length of rail about 12 ft. long which shows some remarkably well defined vertical corrugations or buckles in its web. They are very regular, and their depth is about 3-16 in. and pitch 2½ in. This rail has never been laid in the ground, but was part of a stack left over when the system was first laid down.

It appears to me that this may be a very exaggerated case of what occurs in a great many rails in a much less degree (in a degree, in fact, which is too small to be obesrved with the eye or touch, but which is nevertheless there), and if there is such a state of things in the web of the rail, surely it would in course of time make itself evident on the head of the rail which it directly supports, and the larger the buckle in the web the sooner the corrugations in the tread will appear.

I said that the pitch of this buckling was 2½ in., and perfectly regular. Now, our corrugations here are of this pitch, and I believe this is a very general measurement throughout the country; surely then it is something more than a coincidence that the pitch of the buckle should be exactly of the same dimensions as the pitch of the corrugation.

Now, as to the cause of this buckling or corrugation of the web of the rail, my idea is that it is caused by contraction owing to the particular rail leaving the rolls at too high a temperature, and the mass of the head and the foot together being much greater than the mass of the web. The latter is the weakest part of the section, and is the one which has to give way; and I further suggest that the "2½ in." bears some relation to the ratio of area of head plus area of foot in proportion to the area of web, which may account for the regularity of the effects.

Of course only a certain proportion of rails would leave the rolls at too high a temperature, and this would account for the promiscuous occurrence of corrugation, or, perhaps, it may be that rails rolled in intensely cold weather, though they leave the rolls at the usual temperature, may cool off quicker, and thus cause the buckling.

Since writing the above, I have examined some more rails in the same stack, and found further instances of the buckling, some of them so small that I could only just detect them by touch and not at all by eye. Moreover, on rails of different manufacture from the others, namely, on Dicker patent rails, I still detected the same effect.

(Signed) LIONEL E. HARVEY.

Sunderland, November 6, 1906.

With reference to my letter which appeared in your last issue, it has been brought to my notice that there is some doubt as to the position of the buckling or corrugation which I observed in the web of the rail. What I meant by a "vertical buckle" was such a one that, supposing the head of a rail to be removed, an observer looking down upon the rail as it lay upon the ground would see the web as a wavy strip having its maxima or minima 2½ in. apart.

Upon looking over an article which appeared in a contemporary by Mr. John Hart, of Middlesbrough, although I do not agree with his theory, I see that, incidentally, he supports mine of the cause of buckling in the web, for he says that a rail usually contracts more in the head than the flange, and therefore I take it more also than the web.

Again, I suggested that the "2½ in." was, perhaps, a function of the ratio of the area of the sections of the head and of the foot to the area of the section of the web. Upon measuring, roughly, such area of a section of 96 lb. rail, and taking only the thick portion of the foot which adjoins the bottom of the web, and excluding the thin extremities of the foot, I find that the ratio does approximate to 2½. I excluded the thin extremities of the foot because it is apparent that these cool off very quickly.

I may say also that it is very probable that the buckle in the web causes segregation at every wave, for unequal stresses must be set up at each wave, and would thus cause regular segregation by purely mechanical means, apart altogether from the question of bad mixing of the molten steel.

(Signed) LIONEL E. HARVEY.

Sunderland, November 19, 1906.

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T.O.T. PHILHARMONIC SOCIETY.

SUCCESSFUL PRODUCTION BY DRAMATIC SECTION.

The dramatic and operatic section of the T.O.T. Philharmonic Society (composed almost exclusively of employees of the London Underground group of companies) gave an excellent performance of Edward German's comic opera, "Tom Jones," in the King's Hall, Covent Garden, on February 8 and 9. This was the third performance by the dramatic section, which at present numbers about 60 members. There was a large audience on both evenings, including several directors of the T.O.T. companies and representatives of other systems.

As in the case of previous performances, the opera was produced under the personal direction of Mr. Emil Hardy, who did his work very thoroughly, though with quite a small number of rehearsals. The settings were highly artistic, and Mr. Hardy succeeded in infusing his caste with an abundance of merriment. Most of the singing was pleasingly tuneful, and the *tout ensemble* was admirable. The show was also beautifully dressed. The dances were skilfully arranged and adapted to the music by Miss Norah Webber, while the direction of the all-important musical side was in the capable hands of Mr. Ewart Beech, who attended to the choral work, and to Mr. C. F. Lambert, who was responsible for the training of the orchestra. Especial praise is due to the orchestra—now about 40 strong—who are all amateurs, and mostly drawn from the vehicle operating staffs. This is one of the few amateur orchestras in London which are independent of professional assistance for their public performances, and it may be said to their own and Mr. Lambert's credit that they displayed marked capability. A noteworthy feature was the playing, as an overture, of the grand march, "Florenzo," which was composed and conducted by Mr. E. J. Jordan, an omnibus conductor attached to Dalston garage.

Of the caste, much could be written in their praise, for several of the members showed far more than the average ability of amateurs. With the general level of achievement so high, however, it would be invidious to particularise, though tribute should be paid to the work of the following—Mr. John Woodington (Tom Jones), Miss Queenie Thomas (Sophia), Mr. Cyril Corker (Benjamin Partridge), Miss Hilary Pay (Honor), Mr. H. A. Walker (Gregory), Mr. G. J. Nicoll (Squire Western), Miss Tilly Mitchell (Lady Bellaston), Miss Pat Morrison (Miss Western), Mr. S. Murlis (Mr. Allworthy), and Mr. E. F. Woodward (Blifil).

Speaking from the stalls at the close of the second evening's performance, Mr. H. E. Blain, C.B.E. (assistant managing director of the Underground Group), expressed on behalf of the audience their warm appreciation of the performance. He was sure the company must have known from the frequent applause how much their efforts had been welcomed. This was only the third work produced by the dramatic section of their society, and he thought he was justified in emphasising how great was the artistic success they had attained. It would be unfair to single out for individual praise any member of the caste. All had commended themselves to the audience—the men had been manly and the women had been both graceful and beautiful.

Mr. Blain proceeded to refer to the self-sacrifice and labour which such a production entailed. He would say to Mr. Lambert how greatly the orchestra had improved, and also congratulated Mr. Hardy on his "production." To Mr. Beech he pointed out that the *tout ensemble* was excellent, and concluded by a graceful reference to Mr. J. P. Thomas and his committee for the work they had done. "May the society live long, and always bring the pleasure it has done to-night," Mr. Blain added, and the audience acquiesced with cheers.

Among those present at the final performance were the following directors and officers of the Underground and associated companies—Sir James Devonshire, K.B.E.; Mr. H. E. Blain, C.B.E.; Mr. C. J. Cater Scott, Mr. H. A. Vernet, Mr. G. J. Shave, Mr. C. J. Spencer, Mr. J. P. Thomas, Mr. S. J. Webb, Mr. C. Leese, Mr. W. S. Every, and Mr. W. Rushton.

EAST LONDON RAILWAY.

A reference to the possible grouping of the London railways was made by Lord Claud Hamilton at the annual meeting of the East London Railway Company at the Great Eastern Hotel, E.C., on January 31. He said that under the Railways Act 1921, the railways in the metropolitan area had been left to take their own course. So far they had considered no scheme of general amalgamation, but he believed it would be in their own interests, and especially in the interests of the public, that they should form one group, which, of course, would include the East London Railway. Unfortunately, the East London was not a free agent, and must be dependent on the final destination of the six lessee companies.

LONDON UNDERGROUND RAILWAY DIVIDENDS.

METROPOLITAN DISTRICT.—Dividend on the ordinary for 1921 of 1 per cent.; £65,000 to reserve, leaving £60,550 to be carried forward. The dividend on the ordinary shares is the first paid since 1882, when the distribution was at the rate of $\frac{3}{16}$ per cent.

LONDON ELECTRIC.—Final dividend on the ordinary of 1¼ per cent., making 3¼ per cent. for the year; £65,000 to reserve, leaving £39,700 to be carried forward.

CITY AND SOUTH LONDON.—Final dividend on the ordinary of 1¼ per cent., making 3¼ per cent. for the year; £36,000 to be placed to reserve (an addition of £11,000 compared with the previous year), leaving £25,000 to be carried forward.

CENTRAL LONDON.—Final dividend on the ordinary stock of 2 per cent., making 4 per cent. for the year. Final dividend on the preferred ordinary stock of 2 per cent., making 4 per cent. for the year. Dividend for the year on the deferred ordinary stock of 4 per cent.; £29,000 to reserve (an addition of £9,000 compared with the previous year), leaving £59,600 to be carried forward.

LONDON GENERAL OMNIBUS.—Final dividend on ordinary of 3½ per cent., free of income tax, making 8 per cent., free of income tax, for the year; £335,000 to be placed to reserve, leaving £67,900 to be carried forward.

ASSOCIATED EQUIPMENT COMPANY.—Trading results for the year do not justify the payment of a dividend on the ordinary shares.

UNDERGROUND ELECTRIC RAILWAYS OF LONDON.—Full interest on six per cent. first cumulative income debenture stock, and 2 per cent., free of income tax, on six per cent. income bonds of 1948 for the half year, with a carry-forward of £26,600.

SOUTH METROPOLITAN TRAMWAYS.—The South Metropolitan Electric Tramways and Lighting Company recommend a dividend on the ordinary shares for the year of 7½ per cent., placing £15,000 to reserve for reconstruction and renewals (an addition of £4,500 compared with previous year), leaving £2,864 to be carried forward, compared with £1,556 brought in.

LONDON AND SUBURBAN TRACTION.—Subject to confirmation in general meetings of the respective dividend announcements by the various companies in which it is interested, and subject to final audit of accounts, the revenue of the London and Suburban Traction Company will enable it to pay 3½ per cent. in respect of arrears on its five per cent. cumulative preference shares, with a carry-forward of £11,523, compared with £1,205 brought in.

METROPOLITAN ELECTRIC TRAMWAYS.—The Metropolitan Electric Tramways recommend a dividend of 7 per cent. on the five per cent. cumulative preference shares, being balance of 4½ per cent. for the year ended December 31, 1919, and 2½ per cent. on account of year ended December 31, 1920, placing £67,500 to reserve for reconstruction and renewals (an addition of £57,500 compared with previous year), leaving £2,420 to be carried forward, compared with £1,538 brought in.

METROPOLITAN RAILWAY.

FINAL DIVIDEND IMPROVED.

The directors of the Metropolitan Railway Company announced on February 3 that, subject to final audit, they recommended a dividend on the ordinary stock for the past half-year at the rate of 3¼ per cent. per annum, making 2¼ per cent. for the year, carrying forward about £17,000 after placing £50,000 to the renewals fund.

The dividend for the corresponding half-year in 1920 was at the rate of 2 per cent. per annum, making 1½ per cent. for the year, when £50,000 was placed to general renewals fund and £15,416 carried forward. The distribution on the Surplus Lands Stock for the past half-year will be at the rate of 3 per cent. per annum, carrying forward about £1,320. The dividend for the corresponding half-year in 1920 was at the rate of 3 per cent. per annum, when £1,000 was placed to reserve and £1,940 carried forward.

LONDON AND BRIGHTON RAILWAY.

FINAL DIVIDENDS DECLARED.

The directors of the London, Brighton and South Coast Railway announced on February 2 that the accounts for the year ended December 31, 1921, subject to the completion of the audit, show a balance which will enable the following dividends to be paid on the ordinary stocks—£4 5s. per cent. for the half-year on the undivided ordinary stock, making, with £1 per cent. already paid, £5 5s. per cent. for the year, the same as for 1920; £4 per cent. for the half-year on the preferred ordinary stock, making, with the £2 per cent. already paid, the maximum dividend of 6 per cent. for the year 1921; and £4 10s. per cent. for the whole year 1921 on the deferred ordinary stock, as compared with £4 10s. per cent. paid for the year 1920, leaving a balance of about £35,671 to be carried forward, as compared with £35,512 brought in.

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FINANCIAL REPORTS AND MEETINGS.

THE EDISON SWAN ELECTRIC COMPANY, LIMITED, has passed the dividend on the preference shares for the half-year to January 31.

J. BROCKHOUSE AND COMPANY, LIMITED, have paid an interim dividend of 5 per cent. (1s. per share), free of tax, on the ordinary shares.

FIFE TRAMWAY, LIGHT AND POWER COMPANY.—The issue of £250,000 7 per cent. debenture stock at 93 was largely over-subscribed, and the list was closed the day after the prospectus appeared.

ALLEN-LIVERSIDGE, LIMITED.—A final dividend has been declared at the rate of 10 per cent., less income-tax, for the six months ended October 31, 1921, making, with the interim dividend paid, 10 per cent. for the year.

LANARKSHIRE TRAMWAYS COMPANY, LIMITED.—The directors decided to recommend a dividend of 6½ per cent. for the past half-year, making, with the interim dividend of 5 per cent. paid to June 30, a dividend of 5¾ per cent. for the year.

CITY OF BUENOS AIRES TRAMWAYS COMPANY (1904).—A balance dividend of 1s. 3d. per share, making 5 per cent., less tax, for the year 1921, has been declared; £2,000 has been transferred to general amortisation fund (against £3,000 last year), and £7,339 is carried forward, against £3,940 brought in.

NEW SOUTH WALES TRAMWAYS.—The report of the Railway Commissioners for New South Wales on the working of the railways and tramways for the quarter ended September 30 last gives the following figures in respect of the tramways—Revenue, £860,142, an increase of £101,203; expenditure, £706,336, an increase of £82,517; percentage of expenditure to earnings, 82·12, an increase of 0·08.

ANGLO-ARGENTINE TRAMWAYS COMPANY.—The results of the working for the year 1921, as cabled from Buenos Aires, will permit of the payment of a half-year's dividend on the 5½ per cent. cumulative second preference shares. This payment, amounting to 2s. 9d. per share, less income-tax at 6s. in the £, will satisfy the arrears to June 30 1917, and will be made to shareholders on the books of the company at February 7, 1922.

HULL TRAMWAYS ESTIMATES.—Mr. E. S. Rayner, general manager of Hull Corporation Tramways, estimates that the undertaking will show a surplus of £554 at the end of the current financial year, in spite of a decrease in revenue of £25,602. He also expects a deficit on the Stoneferry omnibus service (which has been running for six months) of £413. Mr. Rayner estimates that the result of the coming year's operation of the tramways will be a surplus of £11,800.

HONG-KONG TRAMWAY COMPANY have announced that they propose to assign the whole of the undertaking to a new company, to be incorporated under the Hong-Kong Companies' Ordinance, in exchange for shares of that company. The capital of the new company will be 325,000 shares of the nominal value of 5 dollars each, treated as fully paid up. All these shares will be issued to this company. The Board are convinced that this act is in the best interests of the company, to reduce the future liability of the company for Corporation profits tax, and to a great extent eliminate the differences in exchange which occur each year.

CHATHAM AND DISTRICT LIGHT RAILWAYS COMPANY.—The report for the year ended December 31, 1921, states that the revenue for the past year shows a decrease of £3,446, and the expenditure a decline of £1,228, as compared with 1920. The falling-off in net revenue is due to the coal stoppage and trade depression. The sum of £4,000 (against £6,000 last year) is placed to depreciation reserve, and a balance dividend at the rate of 4 per cent. per annum is recommended on the ordinary shares, making 4 per cent. for the year 1921, against 5 per cent. for 1920, £598 being carried forward, compared with £1,608 brought in. Traffic receipts amounted to £86,659, as against £90,080 last year, while the passengers decreased from 16,179,858 to 14,804,378. The car mileage was 974,706, and the company operates 50 cars.

DOUGLAS SOUTHERN ELECTRIC TRAMWAYS, LIMITED.—The annual report states that the season was a comparatively short one owing to the miners' strike, with the consequent loss of Whit-week and practically the whole of June traffic. There was a decrease in the total receipts (less tolls) of £3,700. The net profit was £2,425 (a decrease of £3,599), to which is added £1,568 brought forward from last year, giving an available total of £3,994. The directors recommend a 7 per cent. dividend on preference shares, less income-tax, and a 5 per cent. dividend on the ordinary shares, less income-tax, and that the balance of £1,402 be carried forward. (A reference to the proposed sale of the undertaking will be found in another column.)

ISLE OF THANET ELECTRIC TRAMWAYS AND LIGHTING COMPANY, LIMITED.—The report for the year ended September 30 last shows that the balance of profit compared with the previous year is £696 lower, at £31,448, but the total receipts amount to £105,628, against £97,244. Traffic receipts show a slight increase at £75,481, and £28,598 has been derived from the sale of electricity, compared with £22,626 for 1919-20. Allocations to the various reserve funds total £16,078, against £20,000, while the amount written off the cost of motor vehicles is £352 greater, at £864, than that so applied in the previous year. A half-year's dividend, due in July 1908, was paid on the preference shares in November last, leaving a considerable amount still in arrear. Allowing for this distribution, the amount carried forward is £3,972, against £4,284. The directors have declared a dividend on the preference shares of 2s. 6d. per share, less income-tax.

DUBLIN UNITED TRAMWAYS COMPANY, LIMITED.—The directors recommend a dividend at the rate of 6 per cent. per annum, less income tax, on the preference stock for the half-year ended December 31, and a final dividend at the rate of 7 per cent., less income tax, making 5 per cent. for the year, on the ordinary stock for the same half-year, setting aside £35,000 towards the renewal of track. The dividends and sum set aside for renewal will absorb £83,300, leaving £12,478 to be carried to the next account. The traffic receipts amounted to £675,410, an increase of £74,063, as compared with the previous year. Other receipts amounted to £20,316, the total receipts being £695,726. The number of passengers carried aggregated 7,249,897, or an increase of 1,165,121. The lines worked by the company are the same as a year ago, viz., 54 miles 15·25 chains, and the company has 326 cars. The totalk W.H. generated was 13,766,026.

PROVINCIAL TRAMWAYS COMPANY, LIMITED.—For the year to September 30 last the net revenue received from the local companies was £20,901, against £40,016 last year, to which is added amount brought in, £3,008; transfer fees and interest, £504; income-tax deducted from dividend warrants, £5,982; total, £30,395. Deducting administration and other expenses and charges, there is a balance of £2,675. In the circumstances the directors regret they are unable to advise declaration of a dividend on ordinary shares. During the year £12,455 was paid to the Commissioners of the Inland Revenue in respect of the claim for excess profits duty for 1918. The Grimsby Corporation Bill (to acquire the company's interest in the lease, expiring July 20, 1922, of the section of the Great Grimsby Tramways Company, Limited, within the borough boundaries) has been passed, and the Corporation has given notice of its intention to take over such tramways. The amount to be paid to the company will be settled by arbitration failing agreement between the respective parties. Negotiations with the Plymouth Corporation for the taking over of the company's line within the municipal area on the expiration of the lease on June 30, 1922, are still proceeding. The Cardiff Corporation has given notice of its intention to take over the omnibuses and depots belonging to Cardiff Tramways Company, Limited. Negotiations as to the amount to be paid to the company are proceeding.

LONDON UNITED TRAMWAYS.

PURCHASE OF HAMMERSMITH LINES BY LONDON COUNTY COUNCIL.

At the meeting of London County Council on January 31 it was reported that under an agreement of December 6, 1917, with the London United Tramways, Limited, the Council has to complete the purchase of that portion of the company's undertaking in Hammersmith on or before twelve months from the termination of the war, or at such earlier date within that period of twelve months as the Council may, on giving the company not less than three months' previous notice, require. The chief provisions of the agreement are as follows—

(i.) Payment by the Council of the purchase money of £235,000 in respect of the Company's lines in Hammersmith, the Chiswick power-station, depot, and certain fixed plant, furniture, implements, etc., and a sum of £1,000 deposited with the Hammersmith Metropolitan Borough Council, and 45 cars.

(ii.) The company to be at liberty to convert a part of the generating station into a transforming station, and to use the same for a period not exceeding 21 years, the company providing free of cost during that period a sufficient supply of direct current for the tramways up to 1,800,000 units a year, the Council paying for any excess at a rate to be agreed or determined by arbitration.

(iii.) If the Council gives the company notice at the same time as it gives notice requiring completion, the Council may require the company to work the lines purchased exclusively for such time and on such terms and conditions as the parties agree, the company handing over to the Council gross receipts less working expenses, and a reasonable sum for establishment charges, and the Council lending the company the 45 cars.

(iv.) If the company are not required to work the lines purchased exclusively, the Council is at liberty to run over the company's lines in Middlesex jointly with the company, and the company are at liberty to run over the lines purchased jointly with the Council, the mileage being equal, and each party accounting for gross receipts taken, the other terms and conditions being agreed or determined by arbitration.

(v.) Each party to have the right to fix and alter fares on its own tramways.

(vi.) The company to be allowed access to the transforming station, and the Council to be allowed access to the depot.

The Highways Committee recommended that the purchase should be completed on May 2, 1922, and that the company should be given notice accordingly. As payment will not be made until the next financial year, it is proposed to make provision for it in the capital estimates of 1922-23. This course was adopted.

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TRAMWAY AND LIGHT RAILWAY NOTES.

ABERDEEN.

PASSING STATIONARY CARS—COMPETITION FROM RAILWAYS.

The magistrates, who have been considering the danger caused by vehicles passing on the near side of stationary tramcars, have given instructions that a by-law be framed requiring drivers of such vehicles to proceed at walking pace on such occasions. It is also proposed, in order still further to reduce risks, that certain tramcar stopping-places be rearranged, leaving a clearance for other traffic. The committee of the Town Council responsible for the promotion of a Provisional Order which includes clauses relating to tramway extensions have considered the effect upon the city of the railway companies' proposals to operate road motor services. As it is felt that these would compete unfairly with those of the Corporation, the latter is to oppose such clause in any Bill which the railways promote.

BELFAST.

SUGGESTED FARE REDUCTION—EMPLOYEES' HOLIDAYS.

The chairman of the Tramways Committee (Councillor W. G. Turner), replying to a deputation from the Belfast Anti-Profiteering Committee, who pressed the committee for a reduction of fares, pointed out that the tramways lost £39,000 last year, and therefore they could hold out no immediate prospect of a reduction. They would, however, undertake to reduce fares at the earliest possible moment. At a subsequent meeting of the Tramways Committee an application for extended holidays for the motormen and conductors on account of the arduous and nerve-wrecking duties they have had to perform during the past 12 months was considered. A deputation was received, and the committee decided to grant 12 instead of eight days' holiday.

BIRMINGHAM.

REVERSION TO PENNY FARES.

Penny fares were introduced on the Corporation tramways on February 6. No alterations were made in the stages and fares hitherto in force, but each route is divided up into a number of penny stages, in a few cases overlapping.

BLACKBURN.

RESULT OF THE TRAMWAY POLL.

The poll of the ratepayers on the question whether a clause should be included in the Corporation Parliamentary Bill providing for tramway extensions and the inauguration of omnibus services resulted as follows—For the proposal, 2,354; against, 8,639; majority against, 6,285. Only 20 per cent. of the electorate voted. The clause in dispute, as stated in our issue of January 21, would have involved an expenditure of £268,000. It was inserted in consequence of the report prepared for the Corporation by Mr. A. R. Fearnley (general manager of Sheffield Corporation tramways), which was summarised in our issue of December 17 last. The clause will now, of course, be dropped.

BLACK COUNTRY.

JOINT TRAMWAYS BILL.

Among the Bills which have been deposited for introduction in the next Parliamentary session is one promoted jointly by the Birmingham District Power and Traction Company, Dudley, Stourbridge and District Electric Traction Company, South Staffordshire Tramways Company, South Staffordshire Tramways (Lessee) Company, and the Wolverhampton District Tramways. The large system of tramways in the Black Country which these five companies own or lease are situated within the districts of a large number of local authorities, who are authorised to purchase compulsorily portions of the undertakings at various dates from 1922 to 1938, and at recurring intervals of seven years. The Bill now proposes to synchronise these dates and to postpone the first date of possible purchase by any one authority to within six months after September 29, 1950. From the passing of this Bill there would be incorporated "The Birmingham and Midland Tramways Joint Committee," for the purpose of managing the undertakings of the five companies.

BRADFORD.

TRAMWAY RECONSTRUCTION.

The tramway track renewals which the Corporation hope to carry out in the next 12 months, if the necessary borrowing powers are obtained, will cost about £120,000. It is proposed to rearrange the termini in Forster Square by altering the "island" at the Post Office side of the Square and encircling it with a line of track. This would connect with the Manningham Lane, Church Bank and Bolton Road routes and passengers' barriers would be constructed on the "island," eliminating the present pavement queues. When the existing track in Huddersfield Road, between Odsal Top and Hill Top, Low Moor, is relaid, it is intended that the sleeper system shall be adopted. The Corporation are laying about three and a half miles of double track on sleepers. It is estimated that the cost of the work will be only about 50 per cent. of that of tramway track laid in the usual way, while the maintenance expenses will also be considerably lower owing to the greater resiliency of the rail supports.

BRISTOL.

RATEPAYERS DEFEAT TRAMWAY SCHEME.

By means of a poll on January 31 the ratepayers decided against the proposed tramways along the Low Level Road to Avonmouth. The voting was as follows—For the Bill, 13,241; against, 19,756; majority against, 6,515. The clause which was to have been inserted in the Corporation Bill sought to authorise the provision of tramways along Avonmouth Road, Richmond Road and Terrace, St. Andrew's Road, and Gloucester Road, Avonmouth, as an extension of the tramroad already authorised to be provided on the Avonmouth Low Level Road. Further alternative powers were sought to provide railless traction in the above-mentioned roads instead of the authorised tramroad and the proposed tramways. At a previous statutory meeting of ratepayers, a resolution approving the clause relating to new tramways had been defeated by a large majority.

BURNLEY.

NEW CARS—"REVERSED" STAIRS.

Some of the five new cars ordered by the Corporation Tramways for the Manchester Road system have now been delivered. The cost of each car is stated to be about £4,000. The Ministry of Transport has informed the Corporation that the Ministry has decided not to approve the construction of the "reversed" type of staircase in double-decked tramcars in future. The chairman of the Tramways Committee, vice-chairman, and the general manager were authorised to interview the Ministry of Transport on the matter.

DUBLIN.

SETTLEMENT OF TRAMWAY DISPUTE.

By a majority of 108 (568 against 460) the employees of the Dublin United Tramways Company accepted the company's offer in respect of wages adjustment, and a threatened strike was thus averted. The employees had previously decided by 1,073 votes to 22 to strike against a proposed reduction of 5s. a week and the refusal of the inspectors to become members of the Tramway and Vehicle Workers' Union. Action was deferred, however, pending the result of a conference which took place under the auspices of the Labour Ministry, Dail Eireann, between representatives of the Company and the men's union.

EDINBURGH.

CENTRE POLES FOR PRINCES STREET—LOST FARES.

At a meeting of the Town Council on January 5, Mr. Malcolm Stuart moved that the resolution to have span wires in Princes Street, passed by the Council on December 29, be rescinded. He contended that the Council had consented to this form of overhead equipment on a snatch vote. The citizens generally could not help following in this case the advice of the tramway manager that centre poles would be much less objectionable. Mr. Douglas Elliott seconded and the motion of disapproval was carried by 37 votes to 22. Notice of motion was given to approach the Ministry of Transport for permission to erect centre poles. The decision in favour of centre poles was re-affirmed by the Council on February 2. The Tramways Committee decided to proceed with the electrification of certain sections of route No. 3, Princes Street, Gorgie, Braid Hills, Craiglockhart and Murrayfield, and remitted to a special meeting of the committee the question of the electrification of the northern routes in order that as early as possible the motor omnibuses may be withdrawn. Councillor Mancor (convener of the Tramways Committee), addressing a meeting under the auspices of the local merchants' associations, on January 17, said they had heard a great deal lately about cheap fares. Various tramway authorities had made numerous efforts to calculate some average of what was lost per car-mile through uncollected fares, resulting from a mixture of designs and carelessness on the part of both the public and the conductors, but so far no reliable figures could be given. He felt quite safe and well within the mark when he said that 2d. per car-mile was a very modest estimate. That on the Edinburgh system meant £50,000 per annum. The citizens might endeavour to assist the conductors in trying periods by not forgetting to pay their fares, and assisting as far as lay in their power to see that others did the same. The calculation quoted by Mr. Mancor aroused a good deal of local criticism.

GLASGOW.

THE PAISLEY PROBLEM—COATBRIDGE SYSTEM TAKEN OVER—CONDUCTOR'S DUTY.

The Town Council on January 5 again discussed the proposed purchase of the undertaking of the Paisley District Tramways Company. Mr. Miller opposed the acquisition of the system, which he alleged was in a most unsatisfactory state. Instead of Glasgow paying £200,000 or £250,000 it would probably be found that it

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would take £750,000 to put the system into that condition which would coincide with the city tramways. Mr. T. A. Kerr seconded. Treasurer Kelly moved that the matter should be further discussed by the Tramways Committee. He defended the proposal, and said the running of tramways beyond the municipal area had been profitable to Glasgow. The question of acquiring this system was just a question of price. He admitted the Paisley company had not been a success, and personally he would like to get from Mr. Dalrymple some more definite information as to how the system was to be made to pay. Bailie M'Whirr (convener of the Tramways Committee) supported Treasurer Kelly's amendment, and Bailie Dollan strongly urged the acquisition of the system. It was decided to remit the question to the Tramways Committee. The Coatbridge and Airdrie Tramways, which were recently purchased by the Corporation for £82,250, were taken over by the latter early in January. It is proposed to link up the Coatbridge track with the Glasgow tramways by extending the line which at present ends at Baillieston. On January 11, a lady was awarded £10 damages in consequence of her costume having been damaged in a Corporation tramcar through a button catching in a gap between the spars of the seating. The Corporation denied liability. Evidence showed that the gap was due to the fact that the seat, which also forms the lid of a storage box, had not been pushed into its place, thus leaving a space between the spars of the lid and those of the back. The Sheriff held that it was the duty of a conductor on taking over a car to inspect it with a view to the safety of his passengers, and that this duty had not been fulfilled.

HALIFAX.

PROPOSED NEW SERVICES—LUGGAGE.

The Tramways Committee have recommended the Tramways Sub-committee to consider the purchase of another motor omnibus, with a view to starting a service for Wheatley Valley. The committee also decided to recommend the Council to approve the extension of a single line from the present Skircoat Green terminus to the top of Copley Hill. The committee have resolved to charge for all passenger luggage on the cars when the weight exceeds 28 lbs.

HASTINGS.

TRAMWAY COMPANY'S APPEAL.

In the King's Bench Division, on January 23, Mr. Justice McCardie considered, in the form of a special case stated by the arbitrator, a dispute between Hastings Tramways Company and the Corporation. The action related to the construction to be put upon the word "cable" in the Act of 1920 concerning the construction of No. 1 tramway along the sea front. Counsel for the Company, who appealed against the arbitrator's decision in favour of the Corporation, said the Act threw upon the Company the obligation of connecting new lamps which they had had placed on the tramway standards with the existing main. The Corporation contended that the company must place a new lighting cable, or an addition to the existing one, and the arbitrator upheld that view. Counsel for the Corporation said it was a condition of the withdrawal of their objection to the overhead system that they were to get a new lighting system provided at the expense of the company. His Lordship found there was no statutory obligation on the company to provide a main cable, but only an inter-connecting cable, and he allowed the Company's appeal, with costs.

HUDDERSFIELD.

TRAMWAY EXTENSION TO BRIGHOUSE.

The borough treasurer has submitted a report to the Town Council which showed that the estimated cost of the permanent way for the Brighouse tramway extension was £74,000. The cost of the cars and overhead equipment was estimated at £17,500. The extension was approved subject to financial assistance being obtained from the Government.

HULL.

RELIEVING TRAFFIC CONGESTION—HESSLE ROAD ROUTE.

The City Council have now decided, in order to relieve the congestion at Midland Street corner, to divert the tramcars into Osborne Street. The scheme is estimated to cost £12,000. The Tramways Committee had recommended that the Hessle Road cars be diverted, on the outward journey down Anne Street. The City Council have decided to apply to the Ministry of Transport for an Order under the Light Railways Act, 1896, to enable them to extend the tramways to Hessle, at an estimated capital cost of £36,000.

ISLE OF MAN.

TRAMWAY TO CHANGE HANDS.

At the annual meeting of the Douglas Southern Electric Tramways, Limited, recently held at Manchester, it was reported that during the past year an agreement was entered into with the Douglas Head Marine Drive Company, Limited, by virtue of which, at the end of the concession in 1926, the Drive Company will take over the tramways as a going concern, paying therefor the agreed or arbitrated value of the company's mechanical and electrical plant and half of the value of the permanent way.

LEEDS.

THE "EXPRESS" TRAMWAY ROUTE.

It is understood that the new "express" section of the city tramways on the Roundhay route, between Harehills and Oakwood, may be completed by the end of February if the materials necessary for crossings and junction points are delivered promptly. The erection of the overhead equipment and the laying of the track on ballast and sleepers are in progress.

LONDON.

NEW ROUTE—EMBANKMENT TRAFFIC—PASSENGER'S ARREST, MAGISTRATE'S COMMENT—RAILLESS SCHEME—FARES.

On January 22 a new route of the London County Council tramways was opened between Chelsea and Southwark Bridge, via Clapham, Stockwell, Brixton and Camberwell Green. The total length of the route is nine miles, and there is a three minutes' service during the rush hours and a four minutes' service at other times. A poster just issued by the County Council tramways department states that during the business rush the number of tramcars passing along the Embankment in each direction between Westminster and Waterloo Bridges in one hour is 195, or including trailer cars, 222. It is announced that this record will be further improved as traffic requires. When an East London merchant was charged at Old Street Police Court on January 24 with riding on a County Council tramway car and refusing to pay his fare, Mr. Margetts, defending, pleaded "Not Guilty," and said it was quite a new departure to give a man into custody and keep him at the police station for such a matter. Mr. Pawlyn, representing the County Council, said they had power to detain a man under the Tramway Act or the by-laws. The case for the prosecution was that the defendant, after travelling beyond the penny stage, refused to pay the excess, saying he had got on the wrong car. The magistrate said he was satisfied that there was no intention to defraud, but it was the defendant's own fault that he was in that position. He would have to pay 30s. costs. A County Council tramcar driver was summoned at Greenwich for failing to bring his car to a standstill as soon as possible to avoid impending danger, and Mr. Pattinson, who defended, explained the driver's failure to make a statement to the police after the accident by saying that L.C.C. employees were instructed not to do so. The magistrate (Mr. Disney) said this was a most improper course, as a statement made at the time was very valuable. It was going far beyond the Council's legitimate authority. Mr. Pawlyn, for the L.C.C., said the matter had been gone into very thoroughly between the Council and the Commissioner of Police. Other considerations arose beside police-court proceedings, and there was a good deal to be said for the practice adopted. The General Purposes Committee of Lambeth Borough Council, reporting on the proposed L.C.C. railless trolley omnibus route from West Norwood to Lee Green, stated that it followed very closely that to which the Borough Council had always adhered. The committee were of opinion that the Council should offer no objection to that part of the route lying within the borough, subject to a slight modification that it should be along Chapel Road, instead of through Ernest and Rothschild Streets. It is reported that the London General Omnibus Company has formally arranged with some of the outlying tramways in the Metropolitan district not to reduce fares without consultation between themselves and the L.G.O.C.

NEWCASTLE-ON-TYNE.

LIGHT RAILWAY EXTENSION.

At the City Council meeting, Alderman R. Mayne (chairman of the Transport and Electricity Committee) moved that an application be made to the Light Railway Commissioners for authority to make a branch from the light railway to Westerhope down to Denton Burn, a distance of three-quarters of a mile, at a cost of £15,000. This will take the place of a tramway extension along the west turnpike from the Fox and Hounds down Denton Bank, a distance of a mile and a half, at a cost of £60,420. A reference to the question of the tramway employees' hours will be found on another page.

NOTTS AND DERBY.

HEANOR-ILKESTON ROUTE.

A Bill has been deposited in Parliament by the Nottinghamshire and Derbyshire Tramways Company (as mentioned in our issue of December 15) applying for powers to construct a double line of tramways and tramroads to connect its existing system, terminating at Heanor, with the Ilkeston Corporation tramways. The latter were some time ago transferred by the Coporation to the company. In order to provide a through service the gauge of the Ilkeston tramways will be altered from 3 ft. 6 in. to 4 ft. 8½ in. The capital required is to be provided by empowering the company to raise the balance of its unissued capital of £96,470 as preference capital and to borrow upon its issued capital a sum of £126,765.

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OLDHAM.

INCREASE IN PARCELS RATE.

Manchester Corporation Tramways notified the Oldham Tramways Committee that on April 3 the minimum parcels rate would be 4d. for parcels not exceeding 7 lb. in weight, and in order to make this applicable to inter-chargeable districts in the Manchester and Salford areas, they suggested Oldham should fix a minimum rate of 6d. per parcel not exceeding 10 lbs. The suggestion was approved.

PONTYPRIDD.

REDUCED FARES AND TOKENS.

The Tramways Committee decided to recommend the Council to reduce, by means of tokens, the fares of workmen by 20 per cent and those of ordinary passengers by 12½ per cent. The Rhondda Tramways Company wrote to the Council suggesting a mutual reduction of workmen's fares. In a previous report on the question of reduced fares, the engineer and manager of the Pontypridd Urban District Tramways (Mr. J. E. Teasdel) stated that he had obtained from the manager of Newport (Mon.) Corporation Tramways, replies from some 57 towns on the subject. Generally speaking, managers were of opinion that low fares for short distances is a wrong principle for small towns and that a 1d. fare to-day would have almost the same effect as that of the ½d. some years ago. Several managers pointed out that wages and costs had not decreased sufficiently to warrant 1d. fares.

SHEFFIELD.

TRAMWAY EXTENSIONS.

As part of a large scheme for relieving the unemployed, the City Council decided to extend the Ecclesall tramway route to Millhouses Lane and to double the track on the Intake route. The former scheme, which will cost £17,000, has already been started, and work on the Intake route will shortly be put in hand. The length of route to be doubled is about one mile, and at the same time the old rails will be replaced. The estimated cost of the Intake project is £31,000.

SOUTHAMPTON.

FRESH EXTENSIONS—LIGHT RAILWAY ORDER.

An extension of the Corporation tramways to Millbrook has now been opened, and it is expected that the new line from Hampton Park to Swaythling will be brought into use this month. The Minister of Transport has confirmed the Totton Hythe and Fawley Light Railway Order, 1921, authorising the construction of a light railway from Totton to Fawley in the County of Southampton.

ST. HELENS.

TRAMWAYS EFFICIENCY MEETINGS.

Some time ago Mr. L. C. F. Bellamy, general manager of the Corporation tramways, inaugurated a series of efficiency meetings, which are proving very successful. The meetings are held fortnightly in the men's billiard room, and generally conclude with a short smoking concert. The following papers have been read—"Urban Electric Traction—some phases of underground, surface and elevated systems," by L. C. F. Bellamy, general manager. "In the Grip of the Law—a review of tramway legislation," T. Kavanagh, traffic superintendent. Other papers have been read by Mr. F. L. Cokayne, chief inspector, Drivers Fred Jones (vice-president of the social and athletic club), Jackson and Taylor, and Conductor Rowland. Lively discussions followed each paper.

STOKE-ON-TRENT.

PASSING STATIONARY TRAMCARS.

In view of a recent street fatality at Fenton, Stoke-on-Trent Watch Committee have considered the advisability of establishing a by-law to compel motorists to pull up on approaching a stationary tramcar. The matter was referred to the Chief Constable's Consultative Committee.

SUNDERLAND.

STRIKE OF TRAMWAY COMPANY'S EMPLOYEES.

The employees of the Sunderland District Electric Tramways, Limited, struck work on February 2, because the company sought to make a wage reduction higher than that of 3s., which was due under the National Agreement. The company, in view of the serious decrease in revenue, contended that it is unable to continue to pay the present wage bill, and sought a maximum additional reduction of 10s. a week in the case of the higher paid men.

TAUNTON.

COUNCIL AND LOCAL TRANSPORT.

A report was published on January 28, by the Mayor, of the resumed negotiations between the Corporation and Taunton Electric Traction Company in connection with the suggested purchase of the tramway undertaking, which ceased operation last May. From this it appeared that the Special Tramways Committee of the Council disapproved of the proposed purchase and that the Council adopted their recommendation by 12 votes to seven. It is understood that the Tramway Committee's decision arose from financial considerations as the tramways had not made any return upon capital for many years. The committee recommended that steps be taken to endeavour to provide a flexible service of motor omnibuses for the borough by private enterprise. Arrangements will now be made for the removal of the tramway track and overhead equipment by the company. The roadway over a route length of nearly two miles will require to be reinstated.

TYNEMOUTH.

TRAMWAY COMPANY'S LEASE.

The Corporation Tramways Committee, after a meeting with representatives of the Tynemouth and District Electric Traction Company, resolved that the company be informed that the Corporation are prepared to enter into an agreement consenting not to exercise their option to purchase the company's undertaking for a term of 21 years, subject, however, to satisfactory arrangements being made for the Corporation to exercise their rights at intervals during such period on conditions to be agreed. The committee further resolved that the agreement should provide for an improved service and the doubling of the line at various points. Mr. H. A. Stagg (one of the company's directors) stated it was estimated that the cost of doubling the track in John Street, Cullercoats, and of that length to the north situated in the Whitley district, would be from £7,000 to £8,000.

WALLASEY.

REVERSION TO PENNY FARES.

The Borough Council have agreed to the reintroduction of penny stages, and the substitution of a discount of 2d. in the shilling on prepaid tickets, in place of the former plan of selling 13 tickets for a shilling.

YORK.

WITHDRAWAL FROM INDUSTRIAL COUNCIL.

The Corporation Electricity and Tramways Committee, who have decided to withdraw from the National Joint Industrial Council for the tramways industry, reported that they had received a letter from the secretary of the Joint Employers of the District Joint Industrial Council for Yorkshire, Lincolnshire, and North Derbyshire, asking them to reconsider their decision. The committee decided to adhere to their previous resolution of withdrawal.

MR. EDWARD HOPKINSON, M.P.

DEATH OF A PIONEER OF ELECTRIC TRACTION.

Mr. Edward Hopkinson, M.P., one of the principal pioneers of electric traction in this country, and Member of Parliament for the Clayton Division of Manchester, died on January 15, at the age of 62. Mr. Hopkinson was educated at Owens College and Emmanuel College, Cambridge, and was also a Doctor of Science of London University. At the age of 23 he became assistant to Sir William Siemens, the eminent electrical engineer, and afterwards carried out experiments at Portrush on the first electrical tramway constructed in the United Kingdom, and designed the electrical equipment of the Bessborough and Newry tramroad. He joined the firm of Mather and Platt in 1884, and took charge of their electrical engineering department. Later he became vice-chairman of the company.

Mr. Hopkinson will be especially remembered on account of his work in electrifying the City and South London Railway, which was opened in November 1890. This "tube" was the pioneer of its type, and its inauguration represented the largest application of electric power for traction purposes that had been made up to that time. Its equipment was noteworthy from the fact that separate locomotives were used, the armatures of whose motors were placed directly on the axles—an arrangement which, of course, dispensed with gearing. Mr. Hopkinson was awarded the Telford Premium and Stephenson Medal by the Institution of Civil Engineers for a paper in which he described the methods he had adopted. The firm with which he was connected also carried out the original electrical equipment of the Douglas and Laxey Electric Tramway and the Snaefell Mountain Railway (the latter having a continuous grade of 1 in 12 for over four miles), and of the Blackpool-Fleetwood tramway.

Mr. Hopkinson was a past president of the Institution of Mechanical Engineers, as well as of the Manchester Association of Engineers, and was on the Council of the Institution of Electrical Engineers.

The London Safety First Council have issued two new posters, one of which makes novel use in its design of the familiar "put and take" top. The words on each side of the top are made to open a wise injunction as to how street accidents can be avoided. The other poster bears some useful advice, well illustrated, to carmen.

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CONTRACTS AND ORDERS.

The Brush Electrical Engineering Company have an order for truck frame forgings for Glasgow Corporation Tramways.

The Electric Locomotive and Foundry Company, of Gateshead, are to supply an electric storage battery locomotive to the Glasgow Corporation.

The British Thomson-Houston Company have received an order for 114 motors and 100 controllers from the Manchester Corporation Tramways.

Halifax Tramways Committee have accepted the tender of Messrs. Vickers, Limited, Sheffield, for the supply of 72 motor pinion wheels at £1 8s. each.

Bolton Tramways Committee have accepted the tender of Hadfields, Limited, for special tramway rails, points and crossings, for the siding at the south end of the wholesale market.

Blackpool Electricity Committee have accepted, subject to the sanction of the Electricity Commissioners, the tender of Fraser and Chalmers (General Electric Company, Limited) for a 5,000-K.W. turbo-alternator.

Blackpool Corporation Tramways Committee have accepted the tender of the British Insulated and Helsby Cables, Limited, for high tension cable, and that of the Pirelli General Cable Works for low tension cable.

Rotherham Corporation have adopted the Straker-Clough trolley omnibus chassis, and an order has been placed with Clough, Smith and Company, Limited, the sole agents for this vehicle.

The Tees-side Railless Traction Board have placed a further order for four trolley omnibuses with Clough, Smith and Company, Limited. This order is the result of the successful operation of a trial vehicle recently supplied.

Clough, Smith and Company, Limited, of 36 Victoria Street, London, S.W., have secured from the Bloemfontein municipality their latest order for five trolley omnibuses, which will be of the "Straker-Clough" standard design.

Liverpool.—The following tenders have been accepted—1,000 tons of steel tramway rails, Leeds Steel Works; 30 tons of fishplates, Guest, Keen and Nettlefolds; 60 tons of steel tie-bars, Hadfields, Limited; 6 tons of steel fishplates, Horton and Son, Limited; 4,850 copper bonds, the British Insulated and Helsby Cables, Limited.

The Woods-Gilbert Rail Remodelling Company, Limited, of 170 Strand, London, W.C., have received a renewal of their contract with the London County Council for lip cutting and grooving of rails for a further period of twelve months. The company have also entered into a contract with the Exeter Corporation to remove corrugations from the rails.

Italian Railway Electrification.—It has been announced that the Director-General of the Italian State Railways is desirous of receiving tenders for the electrification of the Bologna-Venice-Monfalcon line, which is to be entrusted to private enterprise. Offers are to be received by April 30 next, and should be addressed to the Direzione-General Ferrovie dello Stato, Rome.

London County Council Stores.—The Stores and Contracts Committee of the London County Council, in their report for the three months ended December 31, 1921, mention the following—Electric lamps (14 firms invited to tender), English Electric and Siemens Supplies, Limited, estimated value, £7,250; uniform clothing for tramways department (21 firms invited to tender), John Hammond and Company, Limited, estimated value, £5,766; steel castings for tramways department (permanent way, etc.) (29 firms invited to tender), A. T. Green and Sons, Limited, estimated value, £6,060.

Salford Tramways Committee have accepted the following tenders for car accessories for three months to March 31, 1922—Cable and lamps, Power and Lighting Supplies Company, Limited; cable connectors, etc., L. Andrew and Company; armature and field coils, Barrett and Thornton; insulating varnish, Griffiths Brothers and Company (London), Limited; lamps, British Insulated and Helsby Cables, Limited; carbon brushes, J. Eades; field coils and commutator segments, Metropolitan-Vickers Electrical Company, Limited; brake blocks, National Railway and Tramway Appliances Company, Limited; trolley head slippers, British Insulated and Helsby Cables, Limited; trolley heads, G. W. Alsop; gears and pinions, British Hele-Shaw Patent Clutch Company, Limited.

New Trucks and Equipments for Edinburgh.—The Edinburgh Town Council have accepted the tender of the Peckham Truck and Engineering Company, Limited, of Audrey House, Ely Place, London, E.C.1, for 53 pendulum trucks. These trucks will be constructed for the Peckham Company by the Brush Electrical and Engineering Company, Limited, of Loughborough. The motors and truck brakes will be supplied by the Metropolitan-Vickers Electrical Company, Limited, of Trafford Park, Manchester. The order for 106 controllers required for the 53 cars has been placed with the British Thomson-Houston Company, Limited, of Rugby, while the sets of grid resistances will be furnished by the Electro-Mechanical Brake Company, Limited, of West Bromwich. The amounts of the contracts are as follows—53 tramway trucks, £9,010; 106 interpole light-weight traction motors, £18,020; 106 controllers, £5,814; 53 car sets of grid resistances, £742.

BUSINESS NOTICES.

THE ELECTRO-MECHANICAL BRAKE COMPANY have opened London offices at Donington House, Strand, London, W.C.2, with Mr. F. W. Knight as manager.

TILLING-STEVENS MOTORS LIMITED have appointed Messrs. Bristol Simplex, Limited, engineers, of Broadmead, Bristol, as their agents for Gloucestershire and a portion of Somerset.

OERLIKON, LIMITED.—We are informed that the business carried on by the British, Irish and Colonial department of the Ateliers de Construction Oerlikon has now been transferred to Oerlikon, Limited, Oswaldestre House, Norfolk Street, Strand, London, W.C. The company will represent the former company exclusively in Great Britain and the Dominions, and will sell and instal electrical machinery of all descriptions.

LEO SWAIN AND COMPANY, LIMITED, of 280 Deansgate, Manchester, are sole concessionaires for the North of England and Wales in Continental cross-ribbed cord tyres. These tyres are of special construction, each strand of the cords being embedded in rubber. This, it is claimed, reduces all possibility of friction, and consequently obviates overheating. The tyre is extremely pliable and absorbs a high percentage of road shocks, thus increasing comfort of travel.

THE RAIL AND ROAD CAR EQUIPMENT COMPANY has recently been formed by Messrs. A. V. Dismore and A. J. Smith (with offices at 205-207, City Road, London, E.C.1) both of whom have severed their connection with the late General Seating Company, Limited, for the purpose of continuing the manufacture and supply of various materials similar to those hitherto handled by that company. Among the patented articles which will be supplied by the new company are "Flex-edge" and spring cushions, "Revenu" deck chairs, "N.C." friction fittings, destination and other indicators, lettered screens and various other car fittings and accessories.

"ROAD REINFORCEMENT."—Few booklets issued from a publicity department excel in attractiveness and dignity the one bearing the above title and issued occasionally by the British Reinforced Concrete Engineering Company, of 1 Dickinson Street, Manchester. A feature of the January number is an interesting article on "The Roads of France," which includes two or three fine illustrations of famous highways flanked by the now familiar rows of trees. In an article on "Roads and Prices" the writer says that immediately good and suitable roads are provided, cheaper transport and distribution will bring down both the cost of living and the cost of manufacturing for export. Meanwhile we are losing a great deal of money for want of broad, strong, even, and durable highways.

LONDON COUNTY COUNCIL TRAMWAYS' WALL MAP.—In addition to the new pocket map and guide which the London County Council Tramways department recently issued (as noted in our issue of December 24, 1921), a large wall map of the system is now published. This measures about 33 inches by 26 inches, and forms a very complete and readily understood guide to the many routes. All the principal roads, waterways, parks, and open spaces in London and the suburbs are shown, tramway routes being indicated in red, with the appropriate service number printed at intervals over the whole length of each route. Terminal points are indicated in various colours, according to whether they apply to weekday and Sunday services, weekday services only, Sundays only, etc. Connections with other tramway systems are also shown.

MR. LIONEL ROBINSON, B.A., has taken into partnership MR. W. E. WARRILOW, A.M.I.E.E., as from January 1, and under the name of Lionel Robinson and Company, at 3, Staple Inn, London, W.C.1, they will continue and further develop the sole agency for resistance materials and wires of Henry Wiggin and Company, Limited, Birmingham, which Mr. Lionel Robinson has held for the past 15 years. Mr. Robinson is the originator, with Henry Wiggin and Company, of their well-known "Ferry" resistance wires, largely used in motor starters, controllers, regulators, rheostats, cinema projectors, and also in sliding resistances and many scientific instruments. Mr. Warrilow brings to the business 15 years' experience of commercial work, chiefly in encouraging, through the Press, the sales of electrical and allied products of every description.

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PERSONAL.

Mr. T. W. Bloxam, chief electrical engineer of Belfast, has resigned his position. Mr. Bloxam has been chief engineer since 1907.

Councillor W. G. Turner was unanimously re-elected chairman of Belfast Tramways Committee, and **Councillor D. Anderson** vice-chairman.

Sheffield Corporation Tramways and Motors Committee recommended an increase in the salary of **Mr. H. Watson,** assistant manager, from £500 to £550 per annum, but the City Council, by a small majority, withheld approval.

Mr. H. C. Day has been appointed electrical engineer and tramway manager of Heywood Corporation. Mr. Day was selected from 67 applicants. He succeeds Mr. D. H. Davies, who recently accepted the position of assistant general manager of Chesterfield Corporation Tramways.

Mr. M. B. U. Dewar, who for the past three years has been managing director of the Leeds Forge Company, Limited, has accepted the position of managing director of the Metropolitan Carriage, Wagon and Finance Company, Limited, of Saltley, Birmingham. Mr. Dewar will retain his seat on the board of the Leeds Forge Company.

Mr. F. Schofield, formerly manager of Leyton District Council Tramways (which are now worked by London County Council) has been presented with a gold watch and curb chain as a farewell gift by members of the Leyton Council and Mr. Schofield's late colleagues. Mr. Schofield now holds an appointment on the staff of the London County Council Tramways.

Alderman S. Flint has been presented with a solid silver rose bowl by past and present members of Leicester Tramways Committee in commemoration of his twenty-one years' chairmanship of the Tramways Committee. Alderman Flint was appointed chairman in 1900, and continued to hold the office until last year. His services to the Corporation and the public have been of the greatest value, and during his chairmanship the tramways were electrified and developed from a comparatively small undertaking.

Mr. William Murray.—At a well-attended social function of the Walthamstow Branch of the N.A.L.G.O., held in the Tramways Recreation Hall on January 27, Mr. William Murray (manager of the Walthamstow Council Tramways), who is the chairman of the branch, was the recipient of a handsome easy chair, the gift of the members of the branch. It was intended as a mark of esteem and appreciation of the valuable services rendered by him on their behalf during the three years he has been chairman of the branch, and also as leader of the officials' side of the Local Joint Staffs Committee. Mrs. Murray was presented with a silver cake basket.

The death has occurred of the **Hon. Edward C. Kitson** in his 48th year. He was chairman of Kitson and Company, Limited.

The late **Mr. R. Baron,** who was motor school superintendent in the tramways department of the London County Council, and who died in December last, was referred to by the Highways Committee as a capable and zealous officer. He entered the employment of the Council in 1905.

The Late Mr. E. Holt.—At a meeting of the Ashton-under-Lyne Town Council appreciative and sympathetic reference was made to the late Mr. Ernest Holt, who for nine years was general manager of the Corporation Tramways. Alderman R. S. Oldham (chairman of the Tramways Committee), referring to the loss the committee had sustained by his death, said Mr. Holt was a very faithful servant, and was the most hard-working and painstaking man he had ever known.

Sir George Carter, managing director of Cammell Laird and Company, Limited, died at the residence of his brother-in-law at Barton, Yorkshire, on February 9. Born in 1860 at Gosport, Sir George spent 25 years in the service of Sir W. G. Armstrong, Whitworth and Company, being appointed shipyard manager at the age of 34 and later a director of the company. In September 1912 he resigned his position at Elswick to become managing director of Cammell Laird. Sir George received the K.B.E. in 1917.

Mechanical Appliances for Handling Railway Traffic.—Mr. George Bulkley, A.M.I.Mech.E., of the Great Western Railway, has written an interesting little book (132 pp., 7 in. by 5 in.), with the object of providing a plain explanation as to the employment of mechanical apparatus suitable for handling and carting general goods. Examples are given of what has already been accomplished in this direction, and suggestions are made for future developments. The book contains numerous illustrations showing various kinds of tackle and machines for handling packages and goods of all descriptions. It is published by the *Railway Gazette*, 33 Tothill Street, Westminster, S.W., at a price of 5s.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given in italics.

APPLICATIONS FOR LETTERS PATENT.

The number of the patent is given in brackets.

Motor vehicles (586)—Sir H. Austin.
Safety car control and air brake equipments (268)—British Thomson-Houston Company, Limited (*General Electric Company*).
Combined air and vacuum brake systems (471)—British Thomson-Houston Company, Limited (*General Electric Company*).
Regulation of combustible mixture in internal combustion engines (241)—A. A. M. Durant and London General Omnibus Company, Limited.

(*Continued on next page.*)

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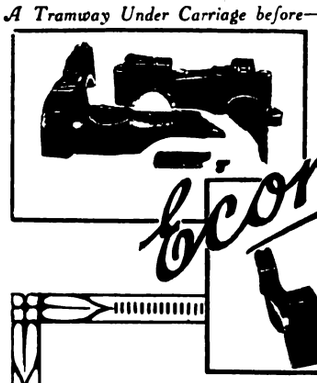

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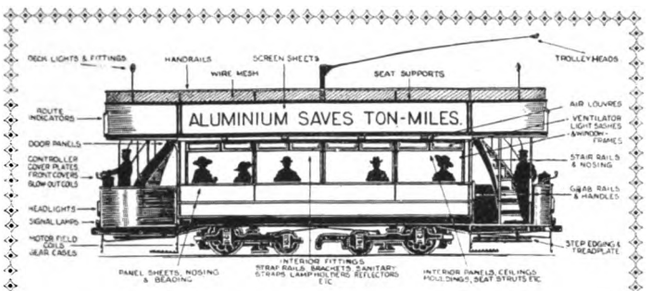

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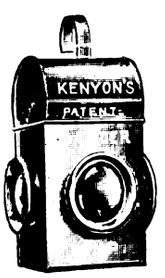

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Lifting jacks (306)—A. Gustiana.
Transmission and/or brake control mechanism of power-propelled vehicles (85)—F. W. Lanchester.
Ignition timing of internal combustion engines (242)—London General Omnibus Company, Limited, and O. W. J. Watson.
Speed indicators for motor vehicles (401 and 402)—A. R. Upward.
Bodies for motor vehicles (532)—C. B. Wardman.
Suspension of power-driven vehicles (302)—E. Zaparka.
Lifting jacks (1,124)—G. P. Appleyard (*G. A. Mortier*).
Steering wheels for motor vehicles (1,106)—W. Buckley.
Lifting jacks (865)—G. H. C. Butler and A. Reeves.
Electrical automatic omnibus sign (711)—H. F. Carey.
Transmission gear of motor vehicles (769)—E. S. Curry and F. Parker.
Mechanical tipping devices for motor vehicles (977)—M. F. Edwards.
Fare boxes (619)—F. Hedley.
Electrically-propelled vehicles (1,137)—P. D. Ionides and Ransomes and Rapier, Limited.
Bodies for motor vehicles (1,254)—R. H. Lea.
Tramway sett (985)—D. McDonald.
Direction indicator for road vehicles (641)—C. Reece.
Petrol supply of motor vehicles (737)—J. H. Simpson.
Devices for securing rails (822)—L. P. Winby.
Emergency brakes for road vehicles (871)—H. E. and W. Ratcliffe and A. Wiseman.
Emergency brake for road vehicles (1,409)—E. Cryer.
Omnibus bodies (1,332)—C. Dodson.
Change-speed gears for motor vehicles (1,649)—M. E. Johnson.
Turnstiles for registering and checking admissions of passengers, etc. (1,436)—London Electric Railway Company and J. P. Thomas.
Steering gear for mechanically-propelled vehicles (1,873)—H. Marles and Marles Steering Company, Limited.
Direction indicators of motor vehicles (1,451)—V. Stuart.
Safety car control and air brake equipments (2,109)—British Thomson-Houston Company, Limited (*General Electric Company*).
Brakes for vehicles (2,193)—G. A. Deadman.
Controlling devices for motors of electrically-driven vehicles (2,089)—F. Krupp Akt.-Ges.
Heat treatment of steel tyres and wheels (2,553)—C. P. Sandberg.
Change speed gear (2,547)—J. B. Smith and R. J. Smith.
Variable speed gears for motor vehicles (2,314)—W. O. Spinks.
Direction indicators for road vehicles (2,639)—V. Stuart.
Steering gears for vehicles (1,909)—F. G. Warbrook.
Passenger vehicles (2,892)—Birmingham and Midland Motor Omnibus Company, Limited, and L. G. W. Shire.
Fare indicators (3,359)—F. W. G. Bruhn.
Brakes for motor vehicles (3,074)—W. Clark.
Electric current collectors for tramways, etc. (2,940)—W. H. Clinkard and E. Nicholis.
Brake or clutch for motor vehicles (2,692)—W. H. Cole.
Lifting jack (2,760)—G. Davies and F. J. Lang.
Motor vehicles (2,975)—J. Patrick.
Omnibus cover (2,874)—R. S. Pulling.
Method of casting brake blocks (2,685)—W. E. Williams.

Specifications Published

1920.

Gear selecting and changing devices for motor vehicles (27,124—*172,448*)—J. Blackburn.
Brake devices for power-driven vehicles (34,434—*154,927*)—Oesterreichische Daimler-Motoren Akt.-Ges.
Jacks and safety brakes for motor vehicles (25,798—*172,709*)—W. Scott, J. B. Goldsmith, and J. Shamsky.
Supporting devices for overhead contact and trolley wires for electric railways and tramways (26,408—*172,735*)—British Insulated and Helsby Cables, Ltd.
Sleeper and chairs for the rails of tramways (35,157—*172,867*)—J. Barrett.
Clutch controls for motor vehicles (26,016—*173,024*)—W. H. Baker, L. Pellat, and V. E. Williams.
Engine starters of motor vehicles (28,698—*173,100*)—A. Harwood.
Lifting jacks (29,109—*173,108*)—A. D. Powell and Lake and Elliott, Limited.
Lifting jacks (33,069—*173,144*)—A. W. Chapman.
Fare systems and means used therewith (26,813—*151,282*)—A. J. Tanner.
Differential mechanism for motor vehicles (28,301—*173,342*)—J. D. Johnson.
Heaters for motor propelled vehicles (18,093—*145,751*)—Perfection Heater and Manufacturing Company.
Motor vehicles (27,594—*173,585*)—S. Coulier.
Bodies of motor vehicles, coaches, etc. (28,770—*173,626*)—W. H. Sadgrove.
Trolley heads for electrically-propelled vehicles (32,003—*173,669*)—R. J. Danson.
Operating mechanism for the speed-gear clutch and brakes of power-driven vehicles (34,667—*155,198*)—Argus Motoren Ges.

1921.

Controlling means for internal combustion engines on motor vehicles (23,774—*168,904*)—Maybach Motorenbau Ges.
Motor char-a-bancs, etc. (3,424—*172,880*)—G. A. Birchley and A. Harvey.
Steering gears for motor vehicles (3,163—*173,440*)—S. E. Alley.

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TRAFFIC RETURNS.

Tramway and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1921. WEEKS ENDED Jan. 8	Jan. 15	Jan. 22	Jan. 29	Feb. 5	1922. WEEKS ENDED Jan. 7	Jan. 14	Jan. 21	Jan. 28	Feb. 4	AGGREGATE. Wks.	1921-22.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	4,034	3,604	3,400	3,435	3,497	3,720	3,327	3,105	2,980	2,974	35⅔	126,666	− 11,323
Aberdeen Motor Buses	...	22	60	59	60	197	130	127	123	130	35⅔	8,757	+ 7,800
Ayr Corporation	632	522	547	553	549	554	463	423	423	436	38	28,080	− 1,943
Barrow Corporation	879	880	862	900	892	641	638	632	679	683	44	37,028	− 2,896
Belfast City Tramways	11,064	11,074	11,307	11,309	11,490	12,080	12,255	11,726	11,921	12,175	44	554,111	+ 49,650
Birkenhead Corporation	2,807	2,683	2,722	2,710	2,587	2,625	2,494	2,497	2,401	2,515	43⅔	115,797	− 12,946
Birkenhead Motor 'Buses	390	357	361	392	364	553	487	503	473	500	43⅔	29,801	+ 11,420
Birmingham Corporation	33,097	33,220	33,194	32,989	32,842	28,641	28,553	27,422	27,836	27,961	44	1,291,235	− 111,017
Birmingham Motor 'Buses	1,845	1,832	1,879	1,901	1,855	1,650	1,694	1,596	1,618	1,637	44	87,353	− 1,344
Blackburn Corporation	2,431	2,395	2,315	2,512	2,558	2,393	2,132	1,810	2,047	2,172	44⅔	106,167	− 9,678
Bradford Corporation	14,381	15,119	13,910	14,279	13,975	13,340	13,669	12,288	12,674	13,310	44	604,665	+ 12,314
Burnley Corporation	3,432	3,438	3,222	3,436	3,470	3,234	3,187	2,708	3,088	3,260	—	—	...
Burton-on-Trent Corporation ...	658	677	653	660	644	583	556	561	582	597	44	27,680	− 497
Bury Corporation	2,489	2,352	2,372	2,478	2,349	2,285	1,958	2,080	2,120	2,160	44⅔	107,959	− 4,716
Chatham and District	1,474	1,686	1,624	1,629	1,629	1,044	1,472	1,363	1,374	1,544	5	6,796	− 1,247
Chesterfield Corporation	696	640	643	660	665	598	559	517	548	571	44	25,773	− 475
Chesterfield Motor Buses	1,017	880	856	932	926	856	644	485	522	648	44	33,487	− 1,969
Derby Corporation	2,367	2,268	2,364	2,371	2,247	2,069	1,999	1,908	1,985	2,041	44	95,218	− 6,513
Dundee City	3,518	3,202	3,087	3,210	3,196	3,290	2,849	2,691	2,812	2,848	37⅔	120,403	+ 5,658
East Ham Corporation	2,336	2,287	2,203	2,203	2,153	2,032	2,023	2,061	2,076	2103	44⅔	93,724	+ 2,077
Edinburgh Corporation	...	...	...	...	...	13,265	12,015	9,576	10,103	10,982	38	483,042	+ 5,369
Edinburgh Motor 'Buses	...	...	...	...	...	3,802	3,085	2,712	2,899	3,222	38	135,836	—
Glasgow Corporation	47,927	44,476	45,428	46,453	47,367	44,896	41,318	39,338	41,458	43,525	35⅓	1,610,523	+ 8,204
Glossop (Urban Elec. Supply Co.)...	246	237	256	244	225	240	228	219	251	214	5	1,152	− 56
Halifax Corporation	4,618	4 375	4,205	4,380	4,458	3,992	3,793	3,439	3,615	3,676	42⅓	189,038	− 1,655
Halifax Motor 'Buses	125	117	117	117	120	66	58	57	57	73	42⅓	3,402	− 1,500
Halifax Railless Cars	...	...	...	...	...	52	48	27	41	31	28	1,523	—
Huddersfield Corporation	5,173	5,139	5,261	5,255	5,219	4,836	4,887	4,638	4,657	4,970	45	233,945	− 9,374
Ilford U.D. Council	1,425	890	645*	1,321	1,261	1,420	1,367	1,387	1,370	1,434	44⅔	66,551	+ 9,516
Ipswich Corporation	897	869	811	831	805	776	705	716	704	757	44	38,224	− 4,877
Isle of Thanet...	570	551	505	520	507	550	525	466	335	528	17⅔	11,130	+ 1,079
Kilmarnock Corporation	460	350	372	383	372	410	313	303	300	314	37⅔	13,675	− 368
Leicester Corporation	6,695	6,602	6,619	6,508	6,396	7,085	6,975	6,957	7,307	7,167	5	35,492	+ 2,650
Liverpool Corporation	27,867	26,855	26,516	27,015	26,678	30,332	29,865	27,771	28,085	28,288	5	144,344	+ 9,413
London County Council	104,394	105,949	102,190	102,064	101,406	88,450	87,768	85,827	84,182	92,040	44	4,312,136	+ 227,810
Maidstone Corporation	535	475	419	410	405	536	435	373	361	395	43	21,002	− 451
Manchester Corporation	39,083	38,324	38,171	38,696	38,661	35,880	36,141	34,433	35,903	36,496	44	1,711,151	+ 186,748
Newcastle-on-Tyne Corporation ...	11,573	11,349	11,155	11,707	11,352	10,516	9,529	8,254	9,606	10,358	44	495,002	+ 6,733
Nottingham Corporation	7,590	7,653	7,525	7,678	7,698	7,224	7,419	6,999	6,998	7,840	44	300,342	− 40 977
Oldham Corporation	4,642	4,563	4,650	4,633	4,483	4,332	4,178	4,397	4,307	4,342	46	216,333	+ 3,129
Preston Corporation	2,014	2,042	1,937	1,939	2,006	1,873	1,875	1,730	1,717	1,783	43⅔	83,923	+ 3,533
Reading Corporation	1,620	1,700	1,546	1,594	1,586	1,557	1,488	1,393	1,397	1,430	44	69,831	− 3,547
Reading Motor 'Buses	297	292	262	259	241	323	307	280	255	291	44	14,992	− 3,320
Rotherham Corporation	2,913	2,696	2,622	2,779	2,829	2,494	2,284	2,051	2,238	2,228	43	97,493	− 17,530
St. Helens Corporation	2,116	2,024	2,039	2,166	2,189	1,696	1,571	1,491	1,574	1,581	44	78,771	− 13,028
Salford Tramways	...	...	10,625	10,858	10,977	...	...	9,409	9,878	10,256	43⅔	473,655	+ 21,935
Sheffield Corporation...	20,947	20,344	20,569	20,861	20,706	18,584	17,714	17,719	17,833	18,261	44⅔	862,375	− 63,924
Southampton Corporation	3,251	3,233	3,057	3,103	3,083	2,855	2,867	2,706	2,836	3,039	44	130,388	− 8,690
Southampton Motor 'Buses	333	310	247	210	201	100	95	88	95	103	44	6,805	− 4,068
Southend Corporation	1,631	1,661	1,629	1,630	1,657	1,865	1,764	1,680	1,696	1,881	44	110,384	+ 6,916
South Shields Corporation	1,940	1,845	1,902	1,982	...	1,716	1,574	1,503	1,573	...	44	73,692	− 10,129
Sunderland Corporation	2,995	2,763	2,824	2,830	2,754	2,549	2,154	2,146	2,203	2,432	44	115,511	− 20,243
Swindon Corporation	397	385	362	359	383	369	356	308	310	351	43⅔	17,341	+ 253
Tyneside Tramways and Tramroads	802	1,115	1,118	1,129	...	473	847	698	784	...	4	2,802	− 1,363
Wallasey Corporation	2,814	2,731	2,698	2,690	2,660	2,706	2,609	2,334	2,340	2,390	44⅔	123,897	+ 7,510
Wallasey Motor 'Buses	139	138	128	133	134	194	215	168	200	175	44⅔	10,502	− 2,880
Walsall Corporation	1,929	1,975	1,982	1,997	1,937	1,550	1,480	1,437	1,481	1,529	45	72,485	− 7,795
Walsall Motor 'Buses	1,345	1,376	1,388	1,420	1,388	891	854	792	847	886	45	41,380	− 10,596
Walthamstow U.D. Council	1,969	1,891	1,876	1,914	1,817	1,614	1,557	1,541	1,538	1,710	44⅔	90,272	− 270
Warrington Corporation	1,012	1,073	1,095	1,090	1,108	1,086	995	980	981	1,047	44	43,913	− 325
West Ham Corporation	6,548	6,512	6,215	6,347	6,141	5,598	5,535	5,348	5,419	5,829	44	260,145	+ 3,732
Wolverhampton Corporation ...	2,407	2,323	2,324	2,307	2,278	2,191	2,111	2,095	2,277	2,137	45	104,998	− 4,200
Wolverhampton Motor 'Buses ...	630	603	616	612	678	622	613	614	666	634	45	29,434	+ 8,800

* Service stopped Sunday to Wednesday inclusive.

Underground Electric Railways Company of London, Limited.

NAME OF COMPANY.	1921. WEEKS ENDED Jan. 8	Jan. 15	Jan. 22	Jan. 29	Feb. 5	1922. WEEKS ENDED Jan. 7	Jan. 14	Jan. 21	Jan. 28	Feb. 4	AGGREGATE. Wks.	1922.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	
Underground Rlys. & L.G.O. Co. ...	...	...	...	...	...	213,332	212,018	199,689	192,358	204,824	5	1,022,221	-
London and Suburban Traction ...	...	...	...	...	...	45,872	45,518	42,557	41,757	45,051	5	220,755	-

Colonial and Foreign Tramway Traffic Returns.

Companies Issuing Weekly Returns.

NAME OF COMPANY.		1921. WEEKS ENDED Jan. 8	Jan. 15	Jan. 22	Jan. 29	Feb. 5	1922. WEEKS ENDED Jan. 7	Jan. 14	Jan. 21	Jan. 28	Feb. 4	AGGREGATE. Wks.	1922.	Increase or Decrease.
		£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine		85,871	84,171	77,716	75,451	78,096	81,642	83,650	80,745	80,036	81,194	5	407,267	+ 5,962
Calcutta	Rs.	97,982	102,176	102,061	67,439	1,359*	97,904	104,981	102,643	99,220	101,078	5	505,826	+ 134,809
Madras...	Rs.	(2 weeks)	38,198*	(2 weeks)	* Nil	...	(2 weeks)	50,849	(2 weeks)	54,390	...	4	105,239	+ 67,041
Pernambuco		4,512	4,789	4,278	4,672	5,013	3,534	3,504	3,639	3,595	3,961	5	18,807	− 5,850

* Strike of employees.

Companies issuing Monthly Statements only.

		1920. Aug.	Sept.	Oct.	Nov.	Dec.	1921. Jan.	Aug.	Sept.	Oct.	Nov.	Dec.	1922. Jan.	Wks.	AGGREGATE. 1921-22.	+ or −.
		£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo		3,588	4,192	4,442	4,810	4,601	...	3,809	4,231	4,682	5,137	4,762	...	36	40,287	+ 2,686
Brazilian Trac. Mlrs		11837000	12043000	1344200	219900	...	...	1574400	1471000	1501600	1455900	...	...	48	155,462.00	+ 33156000
Brisbane		46,650	45,430	46,310	...	...	46,280	50,675	46,220	47,880	...	...	48,790	4	48,790	+ 2,510
British Columbia	$	810,608	806,797	835,054	358,842	17,668	...	844,154	345,185	345,973	877,335	340,113	...	26	5,192,915	− 175,544
Buenos Ayres L'c'z		53,952	53,603	57,619	56,746	58,857	61,111	55,873	55,873	58,492	58,056	53,381	61,198	30	404,817	+ 7,420
Burma		48,553	50,235	55,763	53,696	50,481	50,035	55,168	58,974	64,778	58,271	54,194	59,362	26	350,747	+ 41,984
Cape Town ...		...	23,699	...	25,628	29,768	...	25,164	25,755	26,839	27,004	31,521	...	—	—	—
Carthagena & H. ...		3,721	2,273	3,319	2,714	5,560	3,877	1,773	4,244	3,862	1,717	3,237	3,075	4	3,075	− 802
Cordoba		21,028	19,597	19,627	19,122	19,299	...	23,851	23,204	23,203	22,698	22,641	...	39	207,992	+ 29,564
East India ...		4,109	4,228	4,299	4,234	4,299	...	4,513	4,154	4,054	3,945	4,080	...	26	24,834	− 606
Kalgoorlie... ...		3,111	3,361	3,094	2,969	...	...	2,652	2,829	2,403	2,419	...	...	48	24,944	− 8,728
La Plata		5,715	5,656	6,310	5,573	...	...	...	...	6,587	6,453	...	...	48	58,098	− 3,652
Manila		292,418	280,352	327,652	320,345	315,599	...	297,128	322,212	323,108	306,850	316,467	...	52	3,681,011	+ 262,605
Monte Video ...		42,771	41,816	45,246	43,846	...	50,863	44,672	44,927	47,927	47,426	...	32,634	13	132,190	− 11 454
Para		24,571	23,174	26,772	24,273	24,253	...	22,940	22,225	25,548	23,147	22,650	...	5	22,660	− 1,593
Port Elizabeth ...		...	5,803	...	6,620	8,185	...	6,578	6,477	6,788	6,828	8,344	...	—	—	—
Rangoon ...	Rs.	117,836	114,857	111,830	104,468	120,000	122,588	133,000	132,225	151,000	137,750	145,500	137,850	4	137,850	+ 15,292
Winnipeg ...	$	368,616	426,647	444,899	477,957	...	...	393,823	417,174	441,315	477,880	...	...	48	4,910,971	+ 156,466

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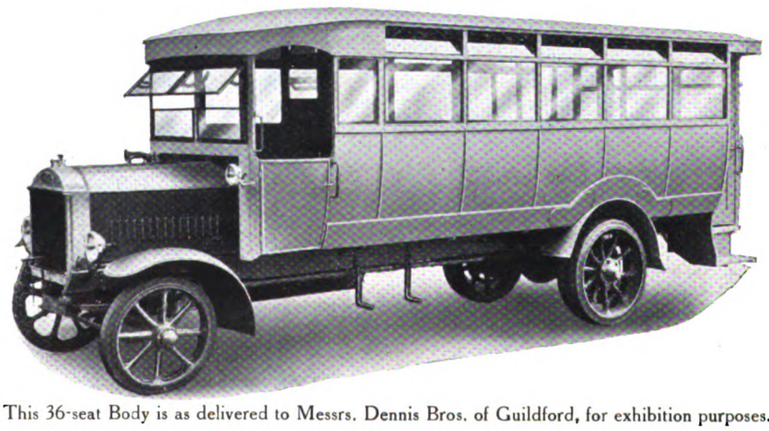

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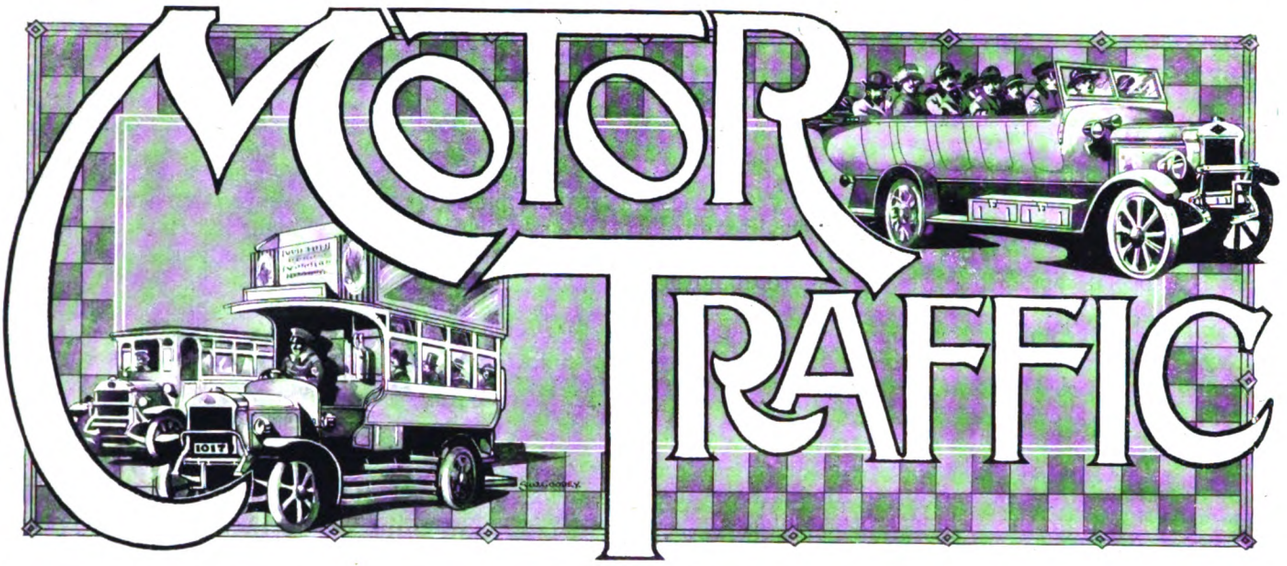

MOTOR TRAFFIC SECTION—SEVENTEENTH YEAR OF PUBLICATION.

THE FUTURE OF THE MOTOR COACH.

While there are obvious economic advantages in employing, for motor coach services, vehicles of very large carrying capacity, the opinion is steadily gaining ground that the future of this type of traffic depends on the development of somewhat less commodious but more handy vehicles, approximating more and more in comfort and speed to the private motor car. It stands to reason that where the volume of custom justifies the employment of very large vehicles, the use of these renders it possible to run a remunerative business without charging unnecessarily high fares. The more we restrict the carrying capacity, the higher must be the average fare paid for a journey of given length. A 16-seater cannot be operated at half the cost of a 32-seater. The saving is not likely to be more than 25 per cent. at the outside and, if the lighter vehicle is fitted with pneumatics and the heavier with solids, it is not improbable that the operating costs will work out at about the same figure in the two cases. This does not necessarily mean that fares must be doubled, because the use of smaller units implies that on the average the number of passengers carried will be a larger percentage of the number for whom accommodation is provided. The average load of a 34-seater is not 34 persons. It may be, perhaps, 20 persons, whereas the average load of a 16-seater under similar conditions may possibly be as much as 13 or 14 persons. In dealing with a given volume of possible custom, the largest actual custom will be obtained by running a considerable number of smaller vehicles and offering a great variety of trips, starting at various hours so that there is something convenient and attractive to every possible customer.

* * *

Despite these facts, we cannot get over the fact that higher fares must be charged for accommodation in the smaller and faster type of vehicle. The change in favour of this type must therefore be supported by reasons sufficiently strong to balance this disadvantage in respect of cost. The main reason is that the large motor coach is unpopular amongst other users of the road, and also amongst those responsible for road maintenance. The net result of this lack of popularity amongst those who do not actually use the vehicles is absolutely certain to be restriction of their use in many districts. If the very cumbrous type of coach could be removed from the roads immediately and replaced by a larger number of smaller machines, the hostile agitation would die down at once, and few, if any, restrictions would be imposed. An instantaneous change is, of course, not practical politics, but the sooner and the more completely the change takes place on a voluntary basis, the fewer will be the restrictions which in a few years' time will otherwise hamper the activity of motor coach proprietors throughout the country. We are strongly of the opinion that before many years have passed, the large type of motor coach so common to-day will be practically obsolete, the traffic now carried by it being taken by vehicles with a maximum capacity of 20 passengers or even less, not of excessive width, unobjectionable from the point of view of overhang behind the back axle, shod with pneumatic tyres, and in practically all respects the equal of the average private motor car from the standpoints of comfort and speed.

TRANSMISSION FOR HEAVY VEHICLES.

If the forecast given above in respect of the future of the motor coach proves to be approximately correct, it is not at all improbable that the development indicated will have a considerable influence upon the design of vehicles for loads of three tons and upwards. So long as there has been a demand for large motor coaches, manufacturers have naturally desired to cater for that demand without complicating their works' programme by the production of special models. This fact has led to the very general adoption of live axle drives on vehicles having a carrying capacity of four or even five tons. The chain drive will never again be popular on passenger-carrying machines. Neither is it at all probable that the chain drive will be retained or reintroduced on any chassis having a carrying capacity of much less than four tons. It is just about at the four-ton mark that the advantages of the chain drive begin to become really important. The main points in its favour are, of course, that it permits of cheaper construction, at the same time

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MOTOR TRAFFIC

reducing the unsprung weight to the advantage both of tyres and of mechanism, and offering ready facilities for the limitation of gear ratios to meet special requirements. The more the passenger-carrying vehicle becomes a special type of its own, or tends to diminish in size, the more will the heavy goods-carrying vehicle be designed specifically for that one purpose, and this will almost certainly mean the increased popularity of chain drives on chassis for heavy loads engaged upon work in connection with which absolute silence is not an essential. The subject is one to which we may return at a later date, merely concluding this note with the remark that the influences indicated above, together with the firm establishment of the live axle as the final drive on private motor cars, have led to a certain amount of misconception detrimental to the employment of the chain drive. The latter, in point of fact, has very marked advantages when heavy loads are to be carried, and must under those circumstances be regarded not as an obsolete system, but as one that has suffered temporarily owing to external considerations in no way reflecting upon its real efficiency or economy.

HAULAGE OF BIG LOADS.

While on the subject of the heavier types of motor vehicle, it is almost impossible to refrain from repeated reference to the serious interference with desirable developments that results directly from the present law in respect of the speed limits of trailer combinations. This law was devised when the trailer was a steel-shod vehicle, often constructed in a somewhat primitive manner, and not originally intended for use in connection with motor transport. The law has served as a deterrent, discouraging improvements which would otherwise have been already perfected. So long as the legal speed of a trailer combination is less than half that of the power vehicle alone, the combination cannot do a bigger ton-mileage of work in the day, and therefore there is seldom any point in using it. Legal axle weights are being somewhat increased, and to take full advantage of this fact it should be legally possible to use trailer combinations at speeds only, say, 25 per cent. lower than those accorded to independent power vehicles. The main argument on the other side is connected with the provision of really adequate trailer brakes but, as already mentioned, this is a problem that has not been properly solved, simply because the law has been such that no compensating benefit could be obtained in return for the cost and trouble of its solution. The difficulties of the problem are not insuperable.

THE FLEXIBLE SIX-WHEELER.

A type of vehicle for heavy loads which has now definitely proved itself a commercial proposition is the flexible six-wheeler in which the driving and the following portions are connected by means of a turntable and universal joints, allowing flexibility in all directions. With a six-wheeler of this type, loads of 7½ to 8 tons can be carried without the axle weights exceeding legal limits. If an independent four-wheeler trailer is also drawn, the load carrying capacity is increased to approximately 12 tons and, if this load could be legally drawn at about 12 miles an hour, those who have heavy loads for transport would be afforded means of materially improving the economy of their transport systems. One of the advantages of the extended adoption of this method would be that in many instances loading and unloading processes could be continued without interruption throughout the day. To make this possible, duplicate trailers and following portions for the six-wheeled vehicles themselves would be required, but the cost of these duplicates would in some trades be saved over and over again by the elimination of the terminal delays otherwise inevitable. The power unit—itself a short wheelbased four-wheeled vehicle or tractor—could be kept usefully occupied with only a few minutes' delay at each terminal for the unhitching of the trailer, the disconnection of the loaded following portion, and the corresponding operations of attaching the duplicates, which would be waiting ready loaded. The trouble about the law is that it will not interest itself in the future, but considers that its work is done when it has legislated for what already exists, ignoring the possibilities of anything fresh being ever introduced. Thus the law penalises the trailer because, in its primitive forms, restrictions of speed are necessary to secure safety. In any new law there must be a very wide loophole to enable increased powers to be accorded, without the delay involved by fresh legislation, to any proposition which does not suffer from the disadvantages taken for granted when the main law was framed. If a trailer combination can be made just about as safe as an independent vehicle, and can be so devised that it will deal with much larger loads without involving excessive axle weights, there is no conceivable reason why the speed of the combination should be absurdly limited. These facts must be taken into account in the new laws and, in so far as it may be impossible to cover them in such a way as to leave the door open to free progress, a loophole, as already suggested, must be provided by giving to some authority the power to reduce—but not to increase—the severity of restrictions whenever a new proposition is brought forward of a kind that justifies such special consideration.

RAILWAYS AND ROAD TRANSPORT.

The London and North Western and Midland group of railways is to promote a Bill early in the present session of Parliament to convey traffic, chiefly goods, by road. The preamble points out that the North Western, Midland and West Scottish group includes the North Staffordshire Railway, which by its Act of 1904 is empowered to acquire and run motor cars or other vehicles for the conveyance of passengers and goods. It is expedient that the London and North Western, the Midland, the Lancashire and Yorkshire, and the Furness Railway Companies should also have similar powers. The companies wish to use road transport for the conveyance of merchandise in any district which their system covers, but not beyond that area. Proper safeguards will be given to traders and competing carriers. The companies do not ask permission to manufacture their own motors. Thus the passage of the Bill should mean a "boom" in the British motor industry.

On February 2 the Metropolitan Municipal Tramways Council, accompanied by Mr. J. Beckett, general secretary of the Municipal Tramways Association, had an interview with Mr. H. L. Thornhill, solicitor of the London and North Western Railway Company, who is acting for the North Western and Midland group in the promotion of the Bill. It was officially notified that the railway companies proposed to withdraw from the Bill at the appropriate time all powers relating to the carriage of passengers by road.

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MOTOR TRAFFIC

THE CHISWICK OVERHAUL WORKS OF THE LONDON GENERAL OMNIBUS COMPANY.

A FINE EXAMPLE OF CREATIVE ENGINEERING.

The overhaul works that the London General Omnibus Company have for some time been erecting at Chiswick are now practically complete, and they constitute the most remarkable engineering feat in connection with a motor omnibus undertaking that has yet been achieved. It is claimed for this factory that it is the most modern in lay-out and progressive in system in the world; and that claim is not likely to be challenged. The carefully thought-out design, the highly specialised equipment, and the skilful organisation that characterise the whole undertaking are in the literal meaning of the word unique. For the first time in motor transport the principle of costs production has been applied to repair and renovation work with results that are bound to enhance the notable success of the Metropolitan omnibus service. Before alluding in brief to the principal features of the new works, it may be useful to recall the rapid growth of the motor omnibus service. It is only a little more than ten years since the last horse omnibus of the London General Omnibus Company was withdrawn from the streets, but at the end of October, 1911, all the company's vehicles were motor driven. In that year the company carried 340 million passengers; in 1913 this number had increased to 710 million passengers, and in 1921 to 932 millions. Its vehicles now number about 3,000 and run the enormous total of 107,309,150 miles per annum.

Notwithstanding the immense expansion of its services, the maintenance of its vehicles has been carried out in much the same way as in the early days of motor traction. All annual and dock overhauls of the omnibuses were made at the various garages, some 36 in number, scattered throughout the metropolitan area. Coach factories and stores were likewise dismembered and much time was wasted in intercommunication, superintendence and inspection. The transportation of supplies and vehicles also involved much dead mileage. Altogether the system had become too unwieldy and uneconomical to be longer endured. The circumstances clearly indicated that concentration of repair work would eventually lead to greater economy not only in the actual work of repair but especially in the saving of lost mileage that was inevitable under the conditions then existing. At the close of 1921, the Company's fleet of omnibuses numbered just over 2,830, consisting of three types, viz., 1,565 of the "B" type, 1,056 of the "K" type, and about 210 of the latest or "S" type. This diversity of types had naturally increased the inconvenience of dealing with repair work in scattered shops. It must be remembered—and we recall the fact because many of our oversea readers may not be aware of it—that the Company work under the somewhat stringent regulations of the police department. Each vehicle must be newly licensed once in twelve months after an annual overhaul. Consequently the Company have to make provision for the reconditioning of about 15 omnibuses each working day. There is thus a constant stream of vehicles through the repair shops, and under the old conditions the problem of coping with the work in a satisfactory manner was fast becoming insoluble. After much careful consideration the Company's engineers envisaged the problem as a whole and saw clearly that by applying to repair work the general methods that have proved so successful in manufacture they could overcome their difficulties once for all. Under the former conditions each omnibus was out of service for 16 days during its annual retreat to the shops. Under the new scheme it was thought possible to reduce this interval to four days, and this estimate is now proved to be correct. If the number of omnibuses be considerably increased, the Chiswick works will continue to deal with them as expeditiously as at present. To-day about 60 vehicles are dealt with each week, but the equipment of the factory is such that by merely increasing the number of men employed it will be possible to overhaul as many as a hundred omnibuses per week. It will be readily understood that to design such an installation so as to meet economically the needs of to-day and yet be capable of large expansion was by no means an easy task. Months were devoted to the preparation of plans and the most painstaking consideration was given to the designs of special machine tools required in the various departments. Many of these are of novel and arresting patterns, and by themselves will repay a visit to the works. In this necessarily condensed account it will be impossible to do more than mention a few of the more interesting among them.

Chiswick Works as Seen From the Air. Entrance from High Road.

The actual construction of the works was begun in September, 1920, but progress was much retarded by difficulties in obtaining supplies and equipment owing to the disturbed labour conditions that prevailed throughout the country. Within a year, however, the undertaking was well advanced. The site comprises 31 acres at Chiswick alongside the High Road and just opposite Gunnersbury station of the District Railway, while the line to Ealing passes at the rear. (Adjacent to the site is that of the large repair shops of the District Railway now under construction.) The main building, 857 ft. long and 352 ft. wide, has an area of 300,000 square feet, and is of ferro-concrete construction. Seven acres are enclosed by it and surrounding the building is a wide concrete road. The administration blocks and the canteens flank the entrance road, and on each side of it are large open spaces, much of which will be devoted to a sports ground for the employees. In all, about 16 acres are at present allocated, leaving some 15 acres for extensions.

The buildings are almost entirely of one storey, and as the concrete blocks are squared and jointed the appearance is pleasing and restful to the eye, the tint resembling that of cream-coloured sandstone. The accompanying plans, though reproduced on a small scale, show quite clearly the arrangement of the factory.

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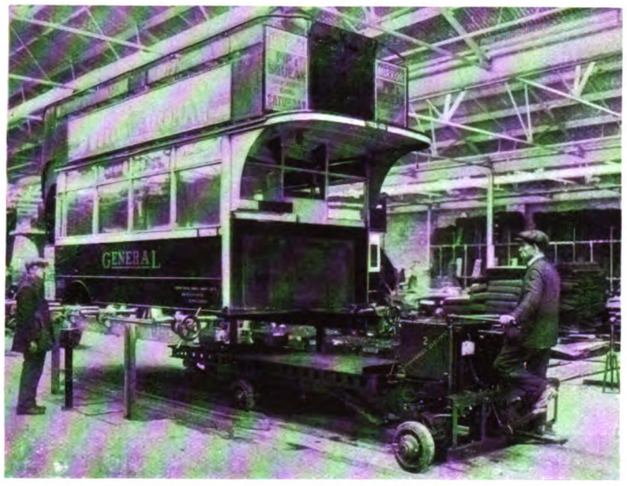
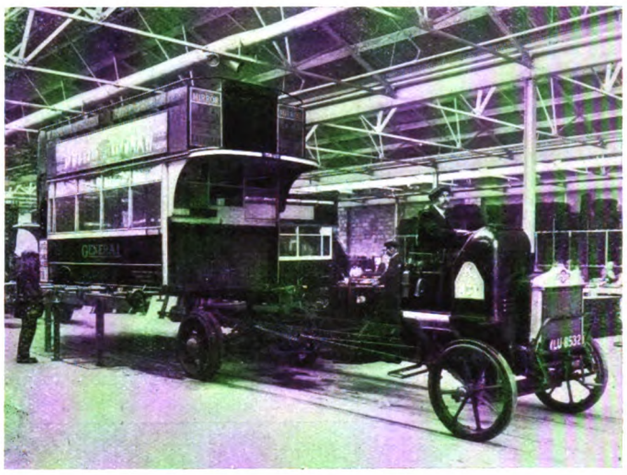
As will be seen, the works building is divided into three main sections. The body building, repair, and paint shops occupy about one-half of the area, the engine and boiler house and stores take about a third, while the chassis overhaul shop occupies the remainder. At this end of the building are also the electrical and experimental department, the millwrights' shop and tool room. Throughout the engineering sections overhead runways have been installed for moving materials, and pneumatic plant supplies air at 80 lbs. pressure for working various tools.



Body Lifted off Chassis by Hydraulic Lift.



Electric Truck being Run Under Body.

In the lay-out of the plant everything has been so arranged as to provide for a progressive movement of work. Machines necessary for the repair of particular components are grouped in such sequence that the work passes from man to man and from section to section in such a way that there is no waste movement, the materials and parts going forward without loss of time.

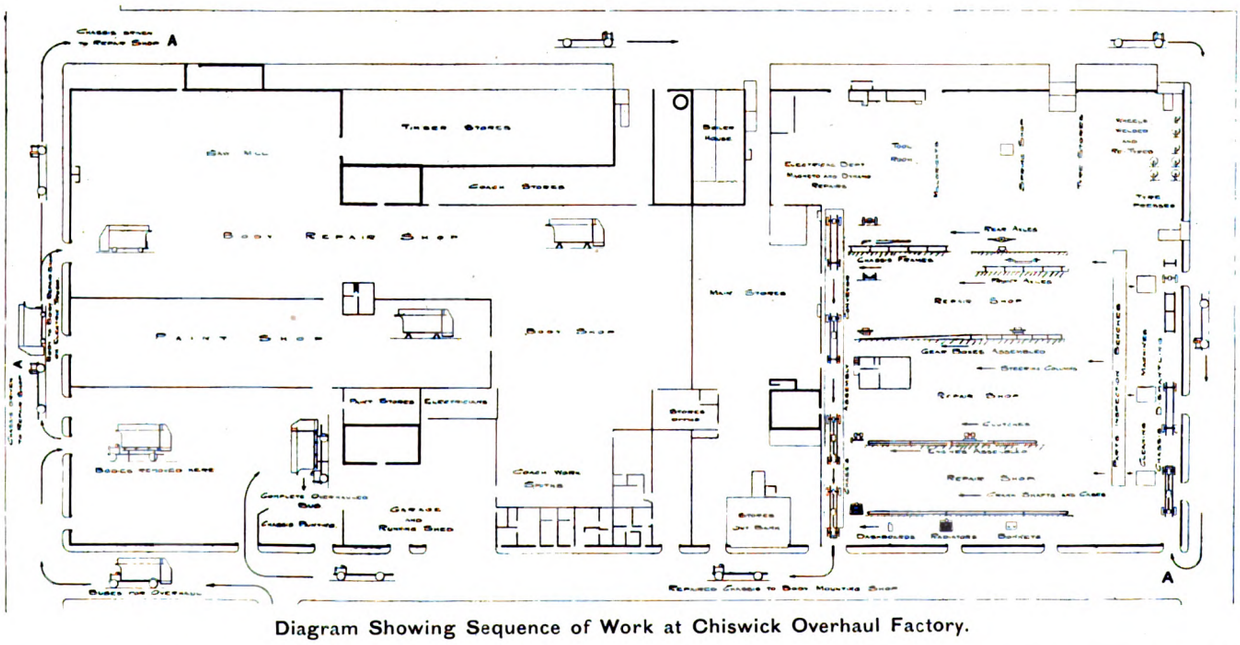


Diagram Showing Sequence of Work at Chiswick Overhaul Factory.

The methods adopted will perhaps best be seen by following an omnibus due for overhaul as it runs down the approach road to the shop. Its first stop is at the licensing department where its licence plates are removed and it then proceeds to the west end of the works. Here the clamps binding the body to the chassis are unfastened; destination and advertisement boards are removed, and with aprons, cushions, etc., are sent to the proper departments. The vehicle is then backed on to a specially designed hydraulic lift, worked by an oil-pump driven by an electric motor, the wheels of the omnibus running in channel irons to ensure correct position without loss of time. While the engine of the chassis is still running the lift raises the body clear, an operation that requires but a minute, and the chassis withdraws, leaves the demounting shop and runs round to a second gate which is located practically in line with the first, but on the opposite side of the factory where it will be subjected to thorough renovation. Both chassis and coachwork, in fact, in their respective departments are by successive stages stripped to their bare bones, each successive dismantling operation following in logical sequence. When this process is complete, reconstruction and repairing follow also in proper sequence.

The body, after the chassis has been removed, is lowered on to an electric truck, manufactured by Messrs. Mossay and Company. This truck has a platform which can be lifted by a gear to the extent of 12 ins. Its platform being telescopic, it will conveniently carry bodies of different types to the body shop, where they are quickly placed on trestles. Only two men are needed for the operations described, which are performed in a few minutes. In the

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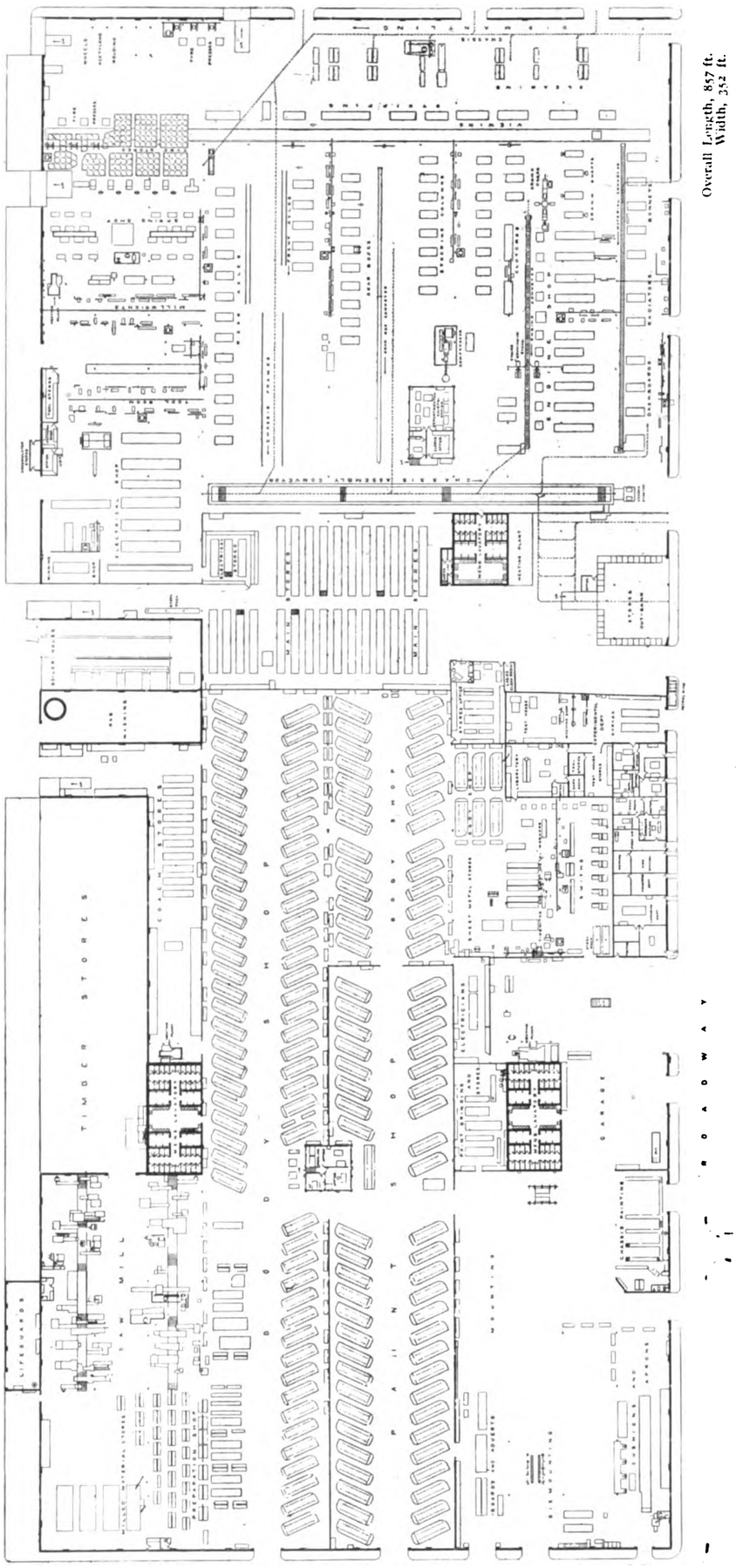

The Chiswick Overhaul Works of the London General Omnibus Company.

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Trimmers' Shop.

Woodworking Shop.

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Special Reamering and Crank Fitting Machine.

One of Several Material Conveyors—In some cases Fitters Work on the Parts as They Move Forward.

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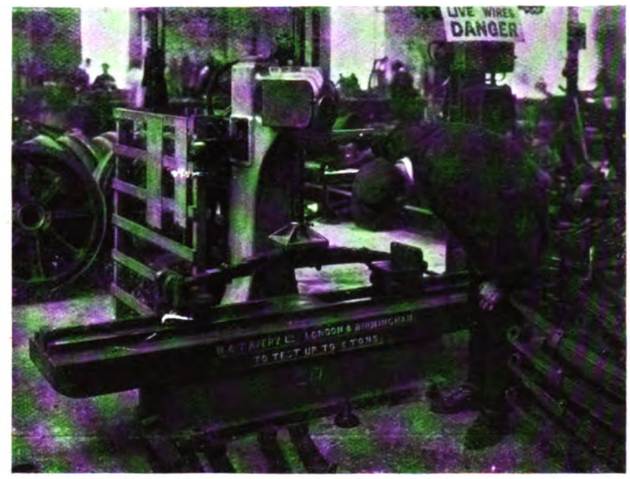
MOTOR TRAFFIC

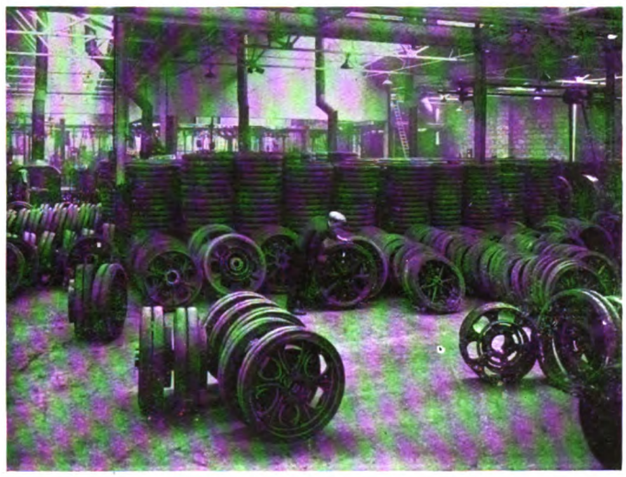
body shop is accommodation for 104 units. The lay-out is simple. On the left-hand side, looking towards the centre of the shop, are the timber stores. Alongside are other completely equipped stores, containing all supplies as are constantly needed in the body shop.

The whole of the supplies for these various stores are taken in by a central door on the south side of the factory. So that there may be no unnecessary movement in supplying any parts required at any stage of overhaul, the raw material, as it flows in at the south door, is distributed in due order over the whole range of stores. As these run the full length of the body shop, whatever particular replacement part is needed is almost automatically to hand at any stage. This arrangement is common to both engineering and coachwork supplies.

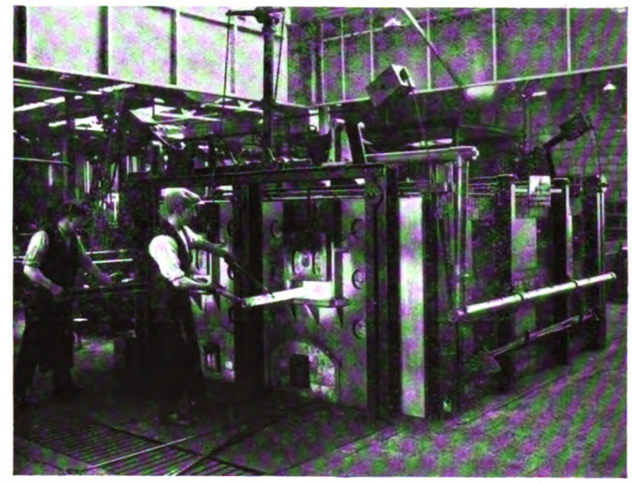
Advertisement Section.



Testing Repaired Springs.



Wheel Store.



Gas Fired Spring Furnace.

The bodies are first completely stripped, and then reconditioned so far as their main components are concerned. Following these operations they pass into the paint shop, where there is accommodation for 57 units. Contrary to the usual practice in a big motor factory, the whole of the body painting is done by hand, for essentially practical reasons which long experience has justified. The coachwork, in fact, is painted in four different colours, but no good system has yet been devised whereby one part can be covered, as it must be covered, before any spray process can be used. For flat painting and first coats, good results are obtained by using a broad-bladed palette knife in place of a brush.

The full time taken to paint and varnish a complete vehicle is five days, an extraordinary performance, considering that the finish is as good as that on the average expensive private car. The painting completed, the body passes into the mounting and finishing shops, where it is fitted with cushions, aprons, boards and advertisements, while the electricians complete the wiring and electric fitting. In the meantime a score of different jobs have been called for, necessitating the employment of smiths, tinsmiths, and other workers.

We may now follow the chassis through its course of dismantling and reassembling. Immediately the engine is stopped, the petrol tank is emptied and the fuel drained, by an underground pipe, into the main storage tank. As each chassis part is taken out, it is removed, by rollway or conveyor, according to its size, and completely dismantled. Each part is tested and inspected before it journeys down the line of workers and benches. The stores are drawn on for the replacement of parts which have become worn. Radiators, bonnet-boards and petrol tanks are the first components to be dismantled. The very thorough radiator washing provision is unusually interesting, serving, as it does, the dual purpose of throwing up every weakness and sign of wear, and preparing the component for repair.

One of the greatest difficulties confronting the motor repair shop is that of obtaining perfect cleanliness in parts grimed and greased by a year's work. The special washing machine, designed at Chiswick to overcome this trouble, is the most successful effort of the kind yet conceived. This machine takes the form of a big-diameter tunnel, carrying, on its inner diameter, coiled piping perforated with many thousands of $\frac{1}{8}$ in. holes. A high temperature caustic solution is forced through the perforations by means of a 6 in.

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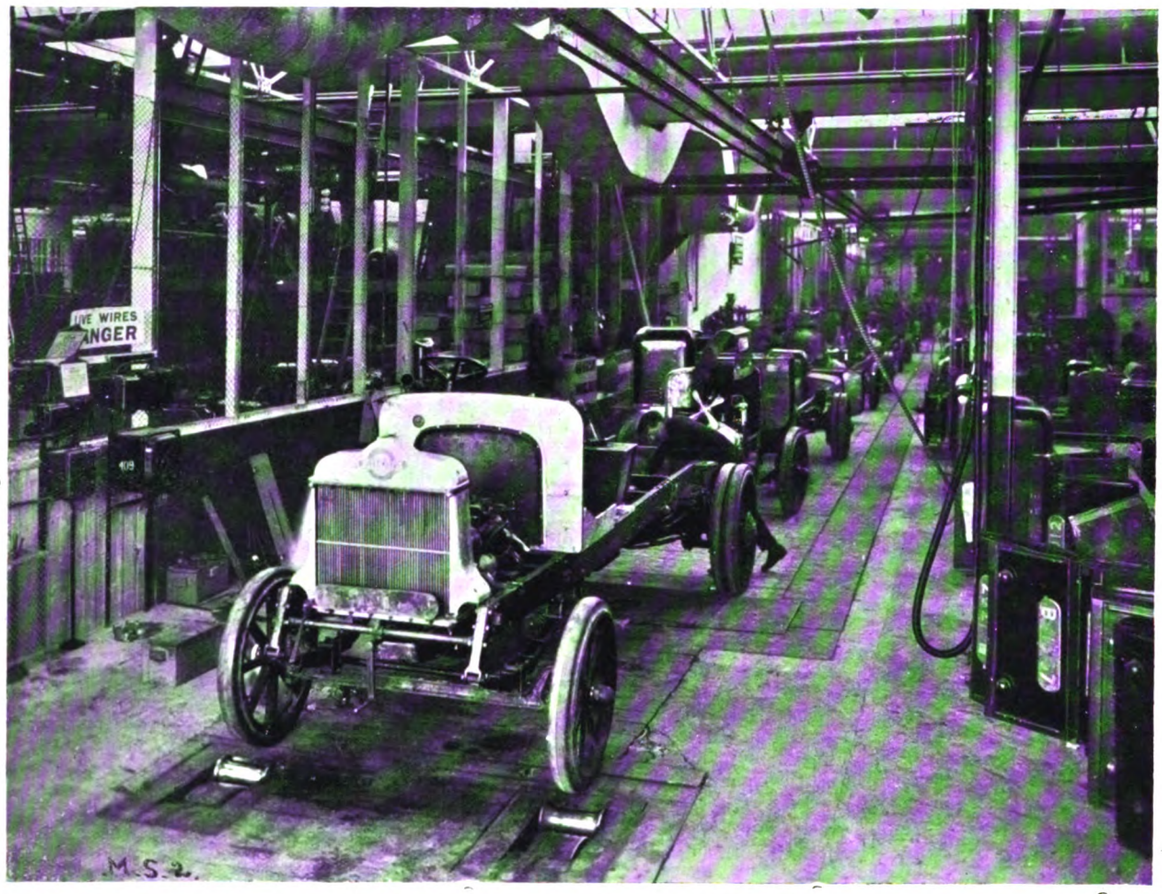
pump, the result being that thousands of high-velocity jets play on every part, from every angle, as the component passes through the tunnel on an automatic conveyor. Three machines of this type are installed. As each is capable of accommodating five components, such as gear boxes, at one time, the total capacity of the washing plant is easily calculated.

As the chassis passes along the shop, it is gradually stripped of engine, clutch, gear box, brakes, back and front axles and steering gear, and all other fittings, down to the bare frame. The wheels go into their own special shop for re-tyring, the tyres themselves being taken from the store immediately adjoining. The springs are re-heated in a double-ended reverberatory gas furnace, with a capacity of 120 springs a day, partly because it is impossible to detect incipent cracks without such treatment, and partly to remove the fatigue brought about by months of wear; also for re-tempering. After tempering, each spring is tested to a fifty per cent. overload in a spring testing machine made by W. & T. Avery, Limited. The millwright's, tool room, and electrical departments are also located in this section of the works.

After the frames have been inspected, repaired and passed as fit for further service, the re-tempered springs are mounted, and the embryonic chassis begins what may be called the outward journey through the works—in other words, reassembling begins. As the frame passes along towards the main moving platform which runs practically the full width of the shop, front and rear axles are also being reassembled until, when they actually reach the main conveyor, they practically fall into position.

Once on the main platform, rebuilding is chiefly a matter of bolting the various units into position. The total length of the platform is 220 ft., and one may walk up the full distance and see, in the course of an hour or so, a chassis completely assembled. The accompanying illustration of the factory lay-out shows very clearly the respective paths of the various components from the time they are stripped from the chassis until, completely rebuilt and tested, they reach the main platform. At exactly the right moment they arrive at the platform ready to drop into the chassis. Gear boxes and rear carden shafts, steering boxes and drop arms, hand brake and gear levers, and all the ordinary complicated gear of a chassis which, however, seems to lose complication and to be simplicity itself when handled in this methodical manner. In due order the parts make their appearance.

As the frame and transmission nears the end of the platform, the time arrives for the engine installation. The rebuilding of the engines deserves particular mention. There is a remarkable boring, reamering and running-in machine installed centrally between the point where the engine is first taken from the chassis and the point where, completely rebuilt, it joins up on the main moving platform. This boring, reamering, and running-in machine is worthy of special attention, for it is unique. It was designed in the Chiswick works. A noteworthy point about it is that it reduces what was formerly a two-day task for skilled fitters to a twenty-minute affair for a machinist.



Chassis Assembling Platform with Engine Starting Device in the Foreground.
This platform moves very slowly, and five squads of men add component parts as the chassis passes their respective sections. Less than three hours elapse during the erection of the chassis.

With the re-metalled bearings bolted down in position exactly as when the crank shaft is installed, the whole crank case is gripped in a jig which makes the ordinary lengthy business of "lining-up" unnecessary. The boring bar is sent through; jig and job together are swung over to the second arm of the machine, and the reamer gets to work; the top half of the lining is removed, the actual crank shaft to be used in the engine dropped in, the lining is replaced, and the machine starts its last operation of "running-in" the shaft. It is amazingly simple and effective.

In the meantime all other engine parts are being overhauled. Worn cylinders, rings, pistons, gudgeon-pins, timing gears and bearings are renewed or passed as fit for further service, all eventually being assembled on a moving platform. When the chassis has moved far enough up the main platform, the engine, complete with

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all its auxiliary gear, leaves the moving conveyor ready to be dropped into place and bolted down.

Radiators, tanks, electric equipment, and details by the score, are fitted in due order, and to a decimal part of an inch. It is not enough that they be perfect in themselves, but it is demanded that they fit with almost microscopic exactitude in their relation to all other parts on the chassis. The system ensures it. If there be any deviation, the system brings it right home to the particular section, gang foreman, view-room man, bench, and actual worker concerned.

The chassis is completely erected by the time it has reached the end of the platform. The radiator is filled; six gallons of petrol are fed to the fuel tank; engine, gear box and back axle have already been supplied with their fixed quantities of lubricant; every knuckle, grease-cup, bearing and joint has received attention; a tester climbs into the driving seat, the chassis passes on to a further position, where the engine is started by a machine operating through the rear wheels, and the unit leaves the shop under its own power for the first test run.

Outside the works testing roads have been built, with a rough surface and a gradient of 1—15, approximately as severe a test of brakes and pulling power as the chassis is likely to experience in the course of ordinary service. This testing place, constructed as a part of the general scheme, involved the making of eight hundred feet of graded roadway with a double hill. From the excavations all the sand and ballast required for the buildings were obtained. Having successfully passed the running test, the chassis is handed over to the licensing department of the works, by whom it must be approved before going further.

The vehicle runs on to its registered track, the coachwork has preceded it by electrical truck, and is held in position on multiple hydraulic jacks similar to those used for dismounting the body in the first place, but in this case the heads have each some degree of universal play to allow for any slight lack of register in the bolt holes of coachwork and chassis. The nuts are screwed home on the holding-down bolts, the battery terminals are coupled up for final test before being submitted to the police passing station—a clean sheet from the authorities being necessary—and the vehicle "passes out," fit for another 30,000 miles of running.

In any short and necessarily condensed account such as this it is impossible to give detailed attention to a host of interesting matters. With the help of the drawings of the factory lay-out, an excellent idea of the whole scheme can, however, be obtained. It must be understood that as every part of either coachwork or chassis is dismantled, it immediately begins a journey which brings it out, either repaired or replaced, at the exact moment and position where it is needed in the reassembling of the whole job. The location of all the stores and offices is worth noting; moving platforms and conveyors are utilised on a bigger scale than in any other factory in Europe. Both the 6 in. per minute engine conveyor and the ingenious gear box roller have exceptional interest.

A very modern experimental shop has been provided. In the laboratory raw materials, fuels and lubricants are tested. There is a dark room for photographic tests and there is a first-aid and rest room where accidents can be treated without delay.

The buildings and plant of this splendid overhaul depot were constructed to plans prepared by the Company's own staff, of whom Mr. G. J. Shave is chief engineer and operating manager; Mr. C. Leese, the engineer in charge of the works; Mr. Owen W. J. Watson, experimental and research engineer; Mr. S. Gage, factory superintendent; and Mr. G. Rushton, production engineer. A visit to the Chiswick works will enable any engineer familiar with modern workshop practise readily to appreciate the ability and resource which these officers and their colleagues have devoted to their task. If, indeed, any reader is inclined to assume that British engineering is to-day lacking in constructive imagination or in its application to new problems, we would commend to him a study of the Chiswick works.

ELECTRIC VEHICLES REDUCE RATES.—The Finance Committee of the Islington Borough Council recommended a reduction of the rates by 1s. 4d. in the £. This has been made possible by, amongst other economies, the saving of 4s. a ton in the cost of refuse collection and street cleansing effected by the use of electrically operated vehicles in place of horse traction. The saving on these services amounts to £14,000 per annum. The vehicles now in use are Edison battery machines supplied by Electricars, Limited, an illustrated description of which appeared in our issue of January 19.

GUILDFORD TO GLASGOW.

DENNIS OMNIBUS'S REMARKABLE RUN.

Some of the vehicles exhibited at the Scottish Motor Show at Glasgow were driven there by road, and owing to the weather conditions this proved a severe test for the machines and a trying ordeal for the drivers. The experiences of Mr. A. S. Hellawell, of Messrs. Dennis Brothers, Limited, who drove a "Dennis" 36-seater' 40-H.P. single-deck omnibus all the way from Guildford, were the subject of an interview in *The Scotsman*, from which we note that on some parts of the journey the snow was 6 ft. high on both sides of the track.

"I first encountered a most violent snowstorm," said Mr. Hellawell, "on the famous Cat and Fiddle Hill in Derbyshire, another between Manchester and Huddersfield, and thereafter the whole way to Edinburgh was bad. Leaving Berwick, we encountered drifts on the Lammermoor Hills of from 5 to 6 ft. deep, varying from a quarter to half a mile in length. There it had been too deep for a snow plough to work, and a way through, the width of a cart, had been cut. The omnibus—far wider than the track—had to force its way through the walls of frozen snow, cutting the sides away with the front mudguards. The journey of one and a half miles through the snowdrift took nearly four hours, the difficulty being not in driving but in steering, which was literally a two-man job, as the hub caps and wheels continually embedded themselves in the snow banks."

Notwithstanding the great difficulties encountered, the "Dennis" omnibus was able to arrive to scheduled time and, in spite of the scratching and tearing through the frozen snow, the machine looked remarkably well. It is interesting to note that the petrol consumption of this 36-seater vehicle, fully loaded, is 7 to 8 miles to the gallon, while it will run 1,000 miles on 1½ gallons of oil. On arrival at Glasgow the omnibus took up its position on the stand of Messrs. Rossleigh, Limited, where its performance, which had been the subject of favourable comment in the Scottish press, attracted to it a great deal of attention.

SIMPLIFYING FOREIGN EXCHANGE.

There is an interesting feature of "Universal Exchange and Interest Tables,"* by Mr. A. J. Lawson, M.Inst.C.E., which will be of particular interest to tramway managers, in that it recalls the suggestions made at the last annual conference of the Municipal Tramways Association in regard to the need for a simplified decimal coinage, and the subsequent correspondence on the matter in these columns. As its title implies, the book consists almost entirely of a series of clear and well-arranged tables, intended, as the preface points out, "to find other and more flexible means of arriving at a correct determination of equivalent monetary values in all currencies and at any rate of exchange, however abnormal." Such tables are, it is observed, rendered necessary by present quotations of exchange having rendered obsolete the old tables of equivalent values in British and foreign moneys. Particularly noteworthy is the author's use of the florin and "cent" in calculation of exchanges, or, in other words, the sub-division of the two-shilling-piece into "farthings" of a new value, giving 100 to each florin instead of 96. The additional new farthing is introduced in each sixpence, and the author's opinion is that very slight effort in mental arithmetic would be needed if we adopted the recommendation contained in the report of the Royal Commission, dated February 23, 1920, that "decimals should be used in the calculations of exchange, and be afterwards reduced to shillings, pence, and decimals." The following are instances of the proposed new sub-division—

Two shillings	=	100 (100 cents)
1s. 6d.	=	75
1s. 0d.	=	50
6d.	=	25

Thus the £1 sterling is equivalent to 1,000 cents. One cent is added at 3d., the second cent at 9d., the third at 1s. 3d., and the fourth at 1s. 9d. in each florin (f.). The departure from strict accuracy is thus in no case greater than one-half farthing. The sovereign would still remain the prime standard of value in the world's exchanges, and the author believes its decimalization into florins, farthings (or cents), and even lower, without other change in the currency, will enormously facilitate the calculation of foreign money values.

* "Universal Exchange and Interest Tables" *from Foreign Trade Tables*. London Thomas Skinner & Co. pp. 242. 15/- net.

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TAXATION OF MOTOR VEHICLES.

RECONSIDERATION URGED BY MOTOR LEGISLATION COMMITTEE.

In a memorandum submitted to the Minister of Transport by the Motor Legislation Committee, it is stated that the duties imposed by the Finance Act 1909-10, were estimated to produce £410,000 on the vehicle tax and £375,000 from the petrol tax, or a total of £785,000. They in fact produced the following revenue—

Year ended March 31.	Petrol Tax.	Car-carriage Tax.	Total.
	£	£	£
1910	320,703	1,061,923	1,823,002
1911	440,376		
1912	623,782	1,019,813	1,643,595
1913	738,781	1,119,919	1,858,700
1914	841,384	1,279,801	2,121,185
1915	964,382	1,263,763	2,228,145
1916	1,793,117*	1,259,087	3,052,204
1917	1,976,031	1,000,811	2,976,842
1918	1,698,922	764,059	2,462,981
1919	2,221,911	981,009	3,202,920
1920	3,000,487	1,642,553	4,643,040
1921 (approx.)	2,430,227	7,200,000	9,630,227
Total	£17,050,103	£18,592,738	£35,642,841

* (1) Petrol duty doubled, August 1915.
(2) The 6d. Petrol Licence Duty imposed in 1916 amounted to a sum of £933,000 not included above.

The increases in petrol duties in 1915 and 1916 were war measures designed to limit motoring and the consumption of petrol, and do not affect the general proposition. At the conclusion of the war, the problems of road maintenance and improvement were affected by the obvious difficulty of obtaining the promised State contribution towards road maintenance in view of the heavy prior commitments. The Road Fund was diverted to the Exchequer from August 1915, to March 1920, so that in fact money provided under a specific bargain for a definite purpose was, under abnormal conditions, utilised for the general purposes of the State, to a total of over £11,000,000. Of this total, however, some £8,000,000 was subsequently returned to the Road Fund.

It was in these circumstances that the interests of mechanical road transport were invited to co-operate with the Ministry of Transport with a view to finding a specific sum for road purposes. It is material to note in the interim report of the Departmental Committee on Taxation and Regulation of Road Vehicles that "the problem before the Committee was the raising of an annual net revenue provisionally estimated at £7,000,000." The schedule of duties proposed by that Committee as shown in the appendix to that report estimated to produce a gross revenue of £9,025,000 and a net revenue, after deduction of costs of collection and payments to local authorities in lieu of carriage duties, of £8,125,000. The Chancellor of the Exchequer, in his 1920 Budget, stated that "in a full year the new taxation should yield £9,000,000, which . . . should leave £8,400,000 to the Road Fund." Sir Eric Geddes, on April 20, quoted a certain resolution adopted by all mechanical road traffic interests that if it could be established that the proceeds of the tax would exceed the sum required, there should be a proportionate reduction all round on the basis of 15s. per H.P. on private motor vehicles. He further stated that it was "agreed that £7,000,000 or £8,000,000 a year is necessary," and again on April 27 that the object "is to raise roughly £8,000,000 a year."

In a statement made on behalf of the Motor Legislation Committee during the passage of the Finance Bill, 1920 (a copy of which is attached hereto), it was specifically admitted that the controversy was "not under existing circumstances a question of the amount of taxation . . . but one entirely of method." At a deputation from the Motor Legislation Committee received by Sir Eric Geddes on May 5, 1921, a very definite undertaking was given that if the money was found to come in in excess of the estimated Budget, mechanical road traffic should not have to go on paying that excess when it would not be necessary on the agreed Budget. "If," he said, "twelve millions were realised, that revenue should not be allowed to continue without their having a chance of talking about it."

The position now is that for the first ten months of operation of the schedule of duties a gross sum of £10,437,997 was received, so that including horse carriage licences it is fair to assume a gross revenue approaching £11,000,000 for the full year, or a net revenue of over £10,000,000 for the Road Fund, as compared with the £7,000,000 stated by the Departmental Committee to be required and £8,000,000 subsequently assumed to be the figure which the mechanical road transport interests had agreed. In other words, the net revenue at a time of great industrial depression is from 20 per cent. to 25 per cent. in excess of the agreed Budget.

If the normal increase in mechanical road traffic continues, it is probable that a revenue exceeding £12,000,000 gross or £11,000,000 net will be forthcoming during the financial year ending December 31, 1922, while it is not unlikely that the cost of road maintenance will decrease instead of increase as compared with the past year.

The Motor Legislation Committee reasserts the contention which was placed before the House of Commons in 1920 that taxation of motor spirit remains the most equitable method of raising the greater part of the revenue required. The petrol imports for the past year will approximate 240,000,000 gallons, so that the flat rate of 4½d. per gallon suggested by the Committee would, as stated, have produced by itself over 50 per cent. of the revenue stated to be required. It was further stated on behalf of the Committee that the proposals of the Finance Bill "are already having and will have a prejudicial effect not only on the motor trade of the country, but on the normal development of economical road transport."

The fears of the Committee have been fulfilled, and the almost unanimous reports of motor manufacturers and dealers and users of private and commercial vehicles indicate that the high scale of direct vehicle taxation has been a very important factor in a pronounced restriction of the development of motor transport. The suggestion made by the Committee that the system in operation "will benefit those users of motor vehicles who can afford to pay, and operate unjustly on the vehicle owner of more moderate means," has been fulfilled to the letter. There is no question that direct vehicle taxation, while representing on a mileage basis a comparatively small increase over the old petrol duty in the case of those large owners of commercial and public service vehicles whose user is regular and continuous, has imposed a very serious hardship upon 90 per cent. of the owners of these and other types of vehicles.

It is for this reason that the Motor Legislation Committee still maintain that before the Budget of 1923 the whole question of the possibility of a reintroduction of a duty upon motor spirit should be reconsidered in the light of petrol imports and the production and use of other forms of liquid fuel.

Apart from the question of method of taxation, the Committee respectfully remind the Minister—

(*a*) That the Government has failed to make its own contribution towards road maintenance expenditure, and that the whole of its burden as contemplated by the Finance (No. 2) Bill 1914, is being borne by the special taxation.

(*b*) Of the resolution referred to in paragraph 5, and quoted by the Minister in 1920 in support of the schedule, that in the circumstances which have actually transpired there should be a proportionate 25 per cent. reduction in the schedule.

(*c*) Of the very striking confirmation of this understanding expressed in 1921 by the late Minister of Transport.

(*d*) Of the fact that the British motor industry is passing through a period of the most acute financial anxiety.

It is in these circumstances that the Committee feel that they have every reason to expect that the Finance Act 1922 will reduce the schedule of taxation contained in the Finance Act 1920, on an all round basis of 25 per cent., to take effect from January 1, 1923.

The Committee maintain that this tax on the motor industry is to be deprecated. Manufacturers and dealers of motor vehicles should receive the utmost assistance possible from the Legislature at a time of the most real financial anxiety. A sum of approximately £100,000 has been received from these licences, and it is not always recognised that most of the vehicles used under the trade licence subsequently pay their appropriate duty.

The Committee are as anxious as the Minister and the police to ensure that these licences shall only be used for strictly legitimate purposes, and for that reason they suggest that the whole question of the amount of duty and the conditions of use of the general identification licence should be reviewed at the earliest opportunity.

The memorandum is signed by Sir W. Joynson Hicks, chairman, and Colonel A. Hacking, general secretary.

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A.E.C. OMNIBUS FOR TORONTO.

CONVERTIBLE FROM SINGLE TO DOUBLE-DECK.

The accompanying photograph is of a new pay-as-you-enter type omnibus supplied by the Associated Equipment Company, Limited, of Walthamstow, to the Toronto (Ontario) Transportation Commission. The body (the registered design of which is covered by British patents in many countries) is convertible from single to double deck, and the time taken to make the transformation

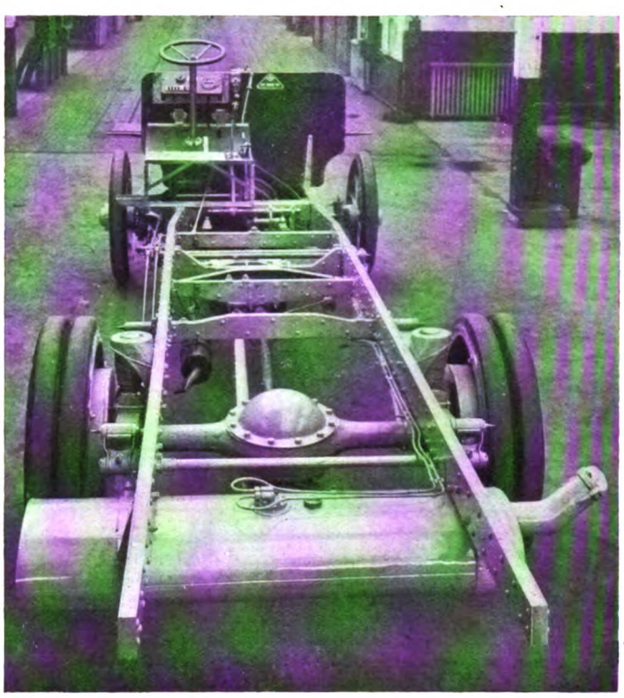
View Showing Upper Deck in Position.

either way is under one hour. Double doors are situated at the forward end of the right-hand side of the vehicle, and are controlled by the driver through a lever at his side. The driver's seat is on the left-hand side, and the stairs to the upper deck are installed at the rear of this seat. The leading corners of the body are rounded off.

Used as a single-deck omnibus, the vehicle has accommodation for 29 passengers; in the double-deck form, 27 outside and 27 inside can be seated. The interior seats are upholstered in Utrecht

The Omnibus as a Single-Deck View.

velvet, whilst those on the outside are of the ordinary garden slatted type. An emergency door is fitted at the rear to comply with local regulations. When running as a single-deck omnibus the staircase hatchway is closed in with a trapdoor. All windows are of the silent drop non-rattling type, and can be fixed in any position. The coachwork is beautifully finished, and the vehicle as a whole presents a charming appearance. The colour scheme is as follows—Bottom panel, lemon chrome; middle panel, lake; top deck, lake; pillars, lemon chrome; lines in gold. The words "Toronto Transportation Commission" appear in gold letters lined black along the sides. Illuminated destination indicators are fitted at the front and rear. The lighting is provided by standard L.G.O.C. double-deck equipment, with two generators, the interior fittings being of pleasing ornamental pattern.



Chassis of New Toronto Omnibus.

The chassis is the standard London "S" type, with the exception of the gear box and back axle. The former is the new 4-speed type, and the latter the banjo type, as fitted to chassis for provincial work. The steering is arranged on the left-hand side. A 30-gallon petrol tank is situated at the rear, petrol being fed by pressure to the carburetter.

OMNIBUS SERVICES.

ABERDEEN.—The Provisional Order promoted by the Corporation includes an application to extend the tramway department's omnibus system at a cost of £30,000.

BERLIN.—The *Electrotechnische Zeitschrift* announces that arrangements have been made for the establishment of three routes of electric accumulator omnibuses in Berlin. The service will be commenced with 80 vehicles, each providing 20 seats and 18 standing places. Re-charging will be effected at the company's stations.

BRISTOL.—The Tramways and Carriage Company who operate tramway and omnibus services on over 600 miles of road in Somerset, Gloucester, and Wilts, now issue their official time table monthly. The services, which are frequently being extended, make it possible to travel by road to Bridgwater, Street, and Frome in the south, Tewkesbury or Broadway, via Gloucester, in the north, and via Swindon to Faringdon or Hungerford in the east.

CHESTER.—On the advice of the chief constable, the Watch Committee have refused to grant licences for omnibuses on routes where there are already efficient omnibus services.

DONCASTER.—The Corporation Bill to be heard in the ensuing session includes an application for powers to run omnibuses by the tramways department within the borough and on certain roads in outside districts. The total length of roads scheduled is 21 miles.

HULL.—At Hull Watch Committee the chief constable submitted an application from the general manager of the Grimsby Street Tramway Company on behalf of the Provincial Tramway Company Limited, for two hackney carriage licences in respect of two 31-seat

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MOTOR TRAFFIC

corridor coaches. The application stated that these would only be used during the summer months for pleasure parties for half and full day tours from Hull, and would not be run in competition with existing local services from Hull. The chief constable reported the result of inquiries as to the practice followed in other districts with regard to allowing omnibuses from outside to ply for hire. The application was granted.

NELSON.—In view of recent price reductions, Nelson Town Council are again considering the advisability of inaugurating motor omnibus services.

NEWPORT-CARDIFF.—Cardiff and Newport Corporations have now agreed as to the conditions regarding a motor omnibus service between Cardiff and Newport.

NOTTINGHAM.—The Tramways Committee have authorised a new omnibus service between Upper Parliament Street and Bulwell Market.

PARIS.—On January 19 the first-class fare on the Paris omnibuses was raised to 50 c. The fare for the first stage of second-class travel remains at 25 c. The result of the change was an increase of traffic on the underground railways and an increased use of taxi-cabs.

ROTHERHAM.—The Tramways Committee are communicating with Rural District Councils regarding proposed extensions of motor omnibus services.

SHEFFIELD.—An application for a licence to run omnibuses between Millhouses tramway terminus and the city boundary has been refused by the Watch Committee.

SOUTHAMPTON.—On January 14 the Corporation Tramways Department offered for sale, by advertisement in our columns, six motor omnibuses, double decked, with a seating capacity of 42.

LEYLAND OMNIBUS'S FINE RECORD.

The Leyland single-deck omnibus shown in the accompanying illustration is in service between Crumlin, Cwmfelinfach, and Newport (Monmouthshire). Originally an R.A.F. "Leyland," the vehicle was reconstructed for the Western Valleys Omnibus Services, and was placed on this route on August 1, 1921. During four months' running it has covered 15,606 miles. When it is reckoned that this works out at nearly 1,000 miles a week, for roughly 16 consecutive

Leyland Omnibus on South Wales Service.

weeks, it will be seen that the performance is highly creditable and affords striking testimony of reliability and sound construction. The reports on its working, in fact, show that the Leyland has proved very satisfactory in these daily runs. A glance at the illustration reveals the sturdy construction of the omnibus—a feature of importance when the nature of the roads in this hilly district of South Wales is borne in mind. It will be observed that in addition to ample side-windows, the roof is constructed to admit additional light to the interior. The ventilation is adequate and the upholstery comfortable. The service on the Newport-Crumlin route covers ten miles and serves a well-populated district

MOTOR VEHICLES FOR MUNICIPALITIES.

MANCHESTER CORPORATION have purchased a 4-ton motor tipping wagon for the cleansing department.

RIPON COUNCIL have asked the surveyor to make inquiries as to the cost of a 30-cwt. petrol tipping wagon.

MANCHESTER TRAMWAY COMMITTEE have purchased two Lacre motor sweeping machines of the three-wheel type.

WORCESTER ELECTRICITY COMMITTEE are considering the purchase of a five or six ton petrol lorry for haulage purposes.

BRIDLINGTON COUNCIL have secured sanction to borrow £944 for the purchase of a steam wagon and three trailers.

CALCUTTA CORPORATION have been recommended by a committee to invite tenders for the supply of eight electric lorries.

WORCESTER COUNCIL are being asked to consider the advisability of introducing mechanically propelled vehicles for street cleansing and watering.

ST. PANCRAS COUNCIL reports that two electric vehicles are working satisfactorily, and are economical, the cost of collection by electrics averaging 13s. 11d. per ton, compared with 15s. 8d. per ton by horse vehicles.

STRETFORD URBAN COUNCIL have adjourned for two months from January 14 consideration of a motor transport department. The officials are to prepare particulars upon which to enable a sub-committee to base recommendations.

PAISLEY CORPORATION have been asked to test a new apparatus which can be fitted to any make of motor wagon for sweeping streets and collecting the refuse at the same time. The apparatus, which has been patented, will cost from £150 to £200.

SYDNEY (N.S.W.) COUNCIL have received a letter from Karrier Commercial Vehicles regarding the purchase of an Elgin street sweeping machine and an Elgin auto-gutter sweeper, claiming that the patent Karrier combined sprinkler, road sweeper, and refuse collector would carry out the combined work satisfactorily and at a cost considerably below that of the two sweepers. The Council, nevertheless, have resolved to purchase the two American machines.

ISLINGTON BOROUGH COUNCIL have borrowed £8,237 for the provision of four 2½-ton electric dust vans, together with charging apparatus. In March last the Council borrowed £57,110 for the purchase of battery vehicles for street watering and refuse collection, also charging plant and garage accommodation. As a result of the experience gained in the use of these vehicles, it is found that one motor vehicle replaces two horse-drawn vehicles for dust collection and four horse-drawn vehicles for street watering. A reduction of costs has also been effected.

DUNDEE OMNIBUS DISPUTE.

COMPANY'S ACTION AGAINST CORPORATION.

In the action in which the Dundee, Broughty Ferry and District Tramways Company seek to interdict the Dundee Corporation from running a motor omnibus service to and from Broughty Ferry, the record has now been closed in the Court of Session. The plaintiffs state that in October last the Sub-Committee of the Corporation Tramways Committee, with the view of testing the amount of traffic on the route, agreed to run a motor omnibus service from the High Street to Castle Green, Broughty Ferry, with power to extend the journey to the end of the esplanade. Plaintiffs contend that the proposed service is *ultra vires* of the defendants, and as ratepayers and as undertakers carrying on a tramway, the plaintiffs object. The route of the omnibus service extends over four miles, and it is held that part of it would be in competition with the plaintiffs' tramways, which form a junction with, and act as an extension of, the Corporation system.

The Corporation hold that the plaintiffs, as statutory tramway undertakers, have no right to complain of the omnibus service, and that the service being within the statutory powers of the Corporation—under Section 50 of the Dundee Corporation Order and Confirmation Act (1907)—an interdict should be refused. The service objected to, they urge, is experimental, and is being run solely for the purpose of testing the amount of traffic on the route.

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MOTOR TRAFFIC

MOTOR TRAFFIC NOTES.

TRAFFIC REGULATION IN PARIS.—In order to reduce traffic congestion, slow moving traffic, including motor vehicles weighing with their loads 8 tons, have been forbidden to use a number of the principal streets of Paris between 2 and 7 p.m.

COACH BY-LAW AT REDHILL.—The Town Council have adopted a by-law under which the police can prosecute passengers in public vehicles using noisy instruments to the annoyance of the residents, and for throwing money to be scrambled for by children.

INCREASED OMNIBUS FARES AT MIDDLESBROUGH.—The Ministry of Transport has authorised an increase of 100 per cent. in the omnibus fares charged by the Middlesbrough Corporation, and the question of charges will be considered by a sub-committee of the Tramways Committee.

GLASGOW LICENCE DUTY DISPUTE.—The Education Committee of Glasgow contend that their motor vehicles used for the conveyance of crippled children, etc., are exempt from licence duty. The magistrates have recommended that the Town Clerk take proceedings in order to have the point determined.

A YEAR'S MOTOR ACCIDENTS IN GLASGOW.—According to a statement by the Town Clerk there were during 1921 accidents involving 604 motor vehicles. The number of persons killed was 37, while 567 were injured. For reckless driving or exceeding the speed limit 268 persons were prosecuted, and the number convicted was 253.

LONDON COACHING SEASON.—The Samuelson Transport Company have advertised that beginning on February 1 their coaches will start at 2 p.m. daily (bad weather excepted) from the National Gallery to make trips round London. It is intended to visit chief points of historical interest. The company's headquarters are now at Page Street, Westminster.

WEIGHING HEAVY VEHICLES.—As some public weighbridges have been broken by heavy motor vehicles beyond the capacity of the weighbridges, Glasgow Corporation propose to issue a warning to drivers. The question of the responsibility of the Corporation for the maintenance of public weighing machines is also to be investigated. Meanwhile motor owners will be held liable for any damage occasioned.

ENGINE AT THE REAR OF THE CAR.—The motor correspondent of the *Birmingham Post* states that the biggest innovation at the Berlin Motor Show was that introduced by Rumpler. The passengers sit in a boat-shaped body without a bonnet, the engine being at the rear, and forming a unit with the back axle. This method of construction enables shorter cars to be built, yet gives better accommodation and greater riding comfort.

HEIGHT OF FRONT ENTRANCE STEPS.—Oxford Watch Committee have had correspondence with the manager of the City of Oxford Motor Services with reference to complaints respecting certain motor omnibuses having entrance from the front only. The committee inspected the vehicles, and decided to inform the company that the steps are too difficult, and should be made easier, and to suggest that if this cannot be done a short ladder should be provided.

THE RECEIPTS FROM TAXES.—The Ministry of Transport, in a return of the tax collected in Great Britain in respect of motor, etc., licences issued from January 1, 1921, to November 30, states that the total gross receipts amount to £10,212,458. The figure is subject to some adjustment. The total gross receipts into the motor tax account to December 31 were—England and Wales, £9,378,648; Scotland, £940,504; total, £10,319,152. The total gross receipts from Ireland were £265,695.

LONDON'S BUSIEST OMNIBUS CENTRES.—During the morning peak load period omnibuses pass Charing Cross to the number of 598 per hour, or, approximately, six a second. In the evening rush hours the figure is 592. These figures make a record for winter conditions, though the peak load record for summer time is higher still. During the busy hours the S type 54-seat omnibuses on the route between Shepherd's Bush and Liverpool Street follow each other at intervals of 90 seconds, so that this service alone is able to transport, in a single hour, 4,320 passengers past any given point.

LONDON ROAD SCHEME.—At a conference of representatives of the Surrey County Council, Kingston Corporation and adjoining districts, on January 10, a resolution was carried that it was desirable to proceed with the scheme for the construction of the proposed arterial road from Kingston Vale to Esher. The scheme provides for a road 100 ft. wide, and the estimated cost of construction, including the acquisition of land, is approximately £290,000. Colonel Brassey, chief engineer to the Ministry of Transport Roads Department, stated that half the cost would be borne by the Government.

EX-SOLDIERS IN THE MOTOR INDUSTRY.—The Central Committee for the Employment of Discharged Soldiers and Sailors, which was formed at a conference held at the Royal A.C. in January 1916, has completed their work. Over 3,500 men have advised the committee of having obtained situations. The committee have reason to believe that many more men obtained appointments to which the committee had introduced them, but did not subsequently acquaint them of their success. In Ireland the Royal Irish A.C. found employment for 943 men. The president of the committee was the Hon. Sir Arthur Stanley.

PROCEEDINGS FOR MOTOR OFFENCES.—Under the Roads Act 1920, the power of dealing with offences in reference to motor vehicles is transferred from the justices to the Commissioners of Inland Revenue. The first offences dealt with in Portsmouth came before the Finance Committee of the Town Council. A fine of 20s. was inflicted for using a side car for which a licence was not in force, and fines of 10s. were imposed for using an unlicensed lorry and car. A prosecution was ordered in a case in which it was alleged that there was fraudulent use of an identification mark and of a licence, and fraudulently lending a licence to another person.

TRANSPORT MINISTRY AND OMNIBUS BY-LAWS.—Bournemouth Corporation have received a letter from the Ministry of Health referring to draft by-laws submitted by the Council, and stating that the Minister of Transport had appointed a Departmental Committee on the taxation and regulation of road vehicles, including in its purview the general question of control of omnibus traffic. The Minister therefore doubted how far it was expedient for the authority for a district comprising parts only of omnibus routes to attempt to deal with the question for the present, and he thought the Council would be well advised to defer the matter.

WINTRY ROADS AND WHEEL SLIP.—In places where the snowfalls during January were heavy, motor vehicles that were not suitably equipped experienced considerable difficulties. Solid rubber tyres will not grip on a steep hill when the road is covered with frozen snow. The trouble is remedied by the provision of chain grips for the rear wheels. With a very slippery surface it is desirable to provide chains for the front wheels if anything like speed is desired. Omnibuses and lorries equipped with giant pneumatics obtain a good hold on dry traffic-hardened snow and also on slush, but on a frozen road it is necessary to provide chains.

LORD WEIR AND THE MOTOR INDUSTRY.—In an article in the "Motor Year Book" for Scotland, Lord Weir states that British car makers overlap and duplicate expensive engineering effort, and have too little standardisation and output. The result is excessive costs and prices. The customers in the world markets and also in our own domestic market "are daily becoming poorer, and are going to remain poor for many years. Nevertheless they require cars because they cannot afford to do without them, but these must be of a utility character. The true obstacle to the British utility car lies in the lack of conception of a design which will enable production possibilities to be realised."

TRANSPORT LECTURES AT LIVERPOOL.—As the fourth of a series of lectures on inland transport arranged by Liverpool University Department of Commerce, Mr. C. le Gosselin on January 16 lectured on "A Survey of Mechanical Road Transport." Referring to the proposals of railway companies to institute road services, the lecturer contended that railway companies should concentrate upon the efficient development of their own form of transport, and not waste their energies in an endeavour to eliminate competition. Road transport, by its general performance of the past twenty years, and the special services it had rendered to the community in times of anxiety had won the right to be allowed free development in competition with other forms of transport, and was worthy of a separate and distinct existence.

TILLING-STEVENS JANUARY ADVERTISEMENT.

Owing to an unfortunate oversight the advertisement of Messrs. Tilling-Stevens Motors, Limited, of Maidstone, in our issue of January 16 contained a block and letterpress relating to an *Evening News* article. The advertisement should have appeared as now printed on the opposite page.

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FOUNDED IN 1892.

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LONDON, FEBRUARY 18, 1922.

LOCAL CONDITIONS DETERMINE WAGES.

The strike of the operating staff of the Sunderland tramways company has arisen from circumstances which, under present conditions, are unfortunately liable to beset any undertaking of comparable size. According to a statement by Mr. Stratton, the manager, the company has of late found itself in a very difficult position due entirely to the unforeseen depression in the coal trade following the miners' strike. It was faced not only with very high costs, but with "a tremendous drop in receipts, culminating in a positive slump since the end of November." As a consequence, the management were forced to notify employees of a reduction in wages greater than that which, under the National Agreement, came into force throughout the industry at the beginning of February. So urgent were the circumstances that the customary three months' notice to terminate the Agreement could not be given by the Company, who were faced with the bare alternative of making the proposed reduction or carrying on the service at a dead loss. Rather than accept the inevitable, the men have deprived the district of its tramway facilities. This case illustrates very typically the problem that arises as soon as a national agreement in such a matter as tramwaymen's wages is entered into. With the best will in the world, no undertaking can pay its servants more than its economic position allows. It cannot be denied that the financial conditions of different tramway concerns must always vary greatly, and any attempt to set up a standard rate of wages which shall apply to all, or to certain ones that may appear to be of similar status, is bound to work inequitably. Tramway undertakings in this country have always existed on a very small margin of profit, and if expenses are to be allowed to grow out of all proportion to the service rendered to the public, the only alternative must be to abandon the service. While a given standard of wages may be fair for undertakings in such populous centres as London, Manchester, Liverpool, and Glasgow, where the ratio of earnings to expenses is comparatively high, it is patent to anyone that the same rate cannot be imposed upon undertakings where receipts and expenses almost balance one another. The idea of a national standard arose, we think, not from the employees but from their leaders, who have endeavoured to force the less prosperous concerns to pay wages comparable to those of the more affluent. Now that tramway traffics which for a long time showed expansion, are diminishing, the undertakings are entering on a period of great difficulty, and it is only by recognition on the part of employees of the facts of the case that they can hope to retain their employment. On the whole, it would seem that the only reasonable solution of the problem is to be found in leaving each undertaking to settle with its own men the rate of wages that can be fairly expected in the prevailing conditions.

TRAMWAYS NATIONAL JOINT COUNCIL.

MARCH 1919, AGREEMENT.—WAGES OF YOUTHS.

A meeting of the National Joint Industrial Council for the Tramway Industry was held at Montagu House, London, S.W., on Wednesday, under the chairmanship of Alderman W. G. Wylie.

It was reported that the committee, on the revision of the 1919 agreement, had held two meetings, and that their report was not ready. The Council therefore decided to hold a special meeting at 11 a.m. on Friday, March 3.

The Interim Report of the Committee (Court of Enquiry) recommended that the following scale of wages for youths under 19 years of age, employed as parcels, messenger, point and trolley boys, be adopted:—

Age.	Basic.	Bonus.	Total.
14—15	10s. 0d.	5s. 0d.	15s. 0d.
15—16	12s. 0d.	5s. 0d.	17s. 0d.
16—17	14s. 0d.	5s. 0d.	19s. 0d.
17—18	18s. 6d.	5s. 0d.	23s. 6d.
18—19	24s. 0d.	5s. 0d.	29s. 0d.

subject to adjustment upon the following sliding scale, in respect of youths between 14 and 19 years of age:—At the rate of 3d. per week for every 5 points rise or fall, in the cost of living from 100 per cent. as a datum figure. The adjustments to be made at the dates agreed to for the adjustment of the bonus paid to adult employees. The reductions in the wages of youths in the employ of the Manchester City Tramways will be made in two cuts at an interval of two months, and in those of youths at Bradford in three cuts at intervals of two months. The reductions will take effect on and from the commencement of the first full pay period following the meeting of the National Council. It was also recommended that steps be taken to prevent the occupations referred to becoming "blind alley" occupations.

UNION'S ATTITUDE.

A national delegate conference of the tramway section of the Transport and General Workers' Union was held in London on Thursday, when a long discussion took place on the proposed revision of the 1919 Agreement. The following resolution was passed:—

"That this conference resolves that it will not accept, even as a basis of discussion, the draft agreement put forward by the employers, and wishes to place on record that it will take drastic action if necessary to safeguard the principles set out in the agreement entered into in March, 1919."

The negotiating committee were further instructed that the negotiations must safeguard the principles of this agreement.

PARLIAMENTARY BILLS.

EXTENSION OF TRAMWAY AND RAILLESS ROUTES.

On February 10 the following Bills were presented in the House of Commons, read a first time and ordered to be read a second time:—

BIRMINGHAM CORPORATION BILL.—This provides, *inter alia*, for the acquisition of land and for the running of trolley vehicles.

BRISTOL CORPORATION BILL seeking powers to construct tramways and other works, to run services of trolley vehicles, and for other purposes.

BRISTOL TRAMWAYS BILL.—This provides for the extension of the times for the construction of certain tramways and the acquisition of certain lands by the Bristol Tramways and Carriage Company, Ltd., to revive and extend the powers for the acquisition of lands forming part of their electricity generating station at Bristol, and for other purposes.

METROPOLITAN RAILWAY BILL, authorising the Metropolitan Railway Company to guarantee and subscribe monies in respect of the British Empire Exhibition.

NORTHAMPTON CORPORATION BILL.—This Bill provides, *inter alia*, for powers to acquire and work omnibuses.

NOTTINGHAMSHIRE AND DERBYSHIRE TRAMWAYS BILL provides for powers to construct additional tramways, and for other purposes.

LONDON AND MIDLAND RAILWAY BILL, authorising the Port of London Authority to construct a floating landing stage and other works at Tilbury, for vesting a part of such stage in the Midland Railway Company, and authorising the latter to construct an extension of the proposed stage.

RAILWAYS (NORTH-WESTERN AND MIDLAND GROUP) BILL, empowering the London and North-Western, the Midland, the Lancashire and Yorkshire, and the Furness Railway Companies to provide and use road vehicles, and for other purposes.

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On February 13, the under-mentioned Bill was ordered to be read a second time :—

LONDON COUNTY COUNCIL (TRAMWAYS, TROLLEY VEHICLES AND IMPROVEMENTS) BILL, to empower the London County Council to construct and work new tramways, to alter and reconstruct an existing tramway, and to make street improvements and other works ; to provide and work trolley vehicles, and for other purposes.

L.C.C. TRAMWAY MATTERS.

REGULATION OF TRAFFIC AT TRAMWAY STOPPING PLACES.

At the London County Council meeting on Tuesday, it was reported that the Highways Committee felt strongly that further measures should be taken on the part of the Council to put a stop to the dangerous practice of vehicles being driven between stationary tramcars and the kerb.—The Council adopted their recommendation, regretting the decision of the Minister of Transport not to take any practical steps at the present time and agreed that a deputation should wait on the Ministry.

RECONSTRUCTION OF TRACK IN ASKEW ROAD, ETC.

On July 27, 1920, the Council approved an estimate of expenditure on capital account of £50,000 for the reconstruction of track, etc., of the London United tramways in Askew, Paddenswick and Dalling Roads, Hammersmith. The Highways Committee now reported that in connection with the execution of the work it would be convenient to arrange for the tramway margins in Studland Street, which were only laid temporarily when the tramways were constructed in 1913, to be renewed, and it was thought that the work could be met out of the capital estimate of £50,000 already agreed upon.

PARLIAMENTARY AGENTS.

Messrs. Dyson, Bell & Company have been instructed to act as agents for the London County Council (General Powers) Bill, 1922, and Messrs. Sherwood & Company to act as agents for the London County Council (Tramways, Trolley Vehicles and Improvements) Bill, 1922. The Parliamentary Committee reported that they had accepted a tender of £59 8s. for lithographing plans in coneection with the schemes included in the latter Bill.

SUMMER TIME.

The Council adopted the recommendation of the General Purposes Committee that, in expressing the opinion that the institution of summer time has been beneficial, it is desirable that it should be made permanent, and they propose to communicate a resolution to this effect to the Prime Minister and to the Secretary of State for the Home Department.

COMMITTEE ON ORGANISATION OF SERVICES.

The Special Committee on the Organisation of the Council's Services are continuing their examination of the organisation of all departments with a view to securing economies and reductions of staff, and the Establishment Committee have decided that no promotions shall be made until the Special Committee have completed their report.

RETIRING OFFICIAL.

Mr. G. F. Blackmore, a principal assistant in the engineers' department, on attaining the age of 65 years will retire on March 21 next. He entered the Council's service in March, 1894, and the Establishment Committee state that he has at all times rendered valuable service to the Council. His present salary is £507 10s. a year, which with the additions will make a total remuneration on retirement at the rate of £759 a year, and he will then be entitled to a retiring allowance under the Superannuation and Provident Fund of about £281 a year.

PENNY FARES AND REVENUE.

All tramway reports were adopted. Several questions were asked about the reduced traffic receipts.

Mr. W. J. Squires (chairman of the Highways Committee), stated that since January 1, when penny fares were re-introduced and stages lengthened, the average loss of revenue worked out at about £10,000 a week. Other traction undertakings had their losses, too, but this was no concern of his. He emphasised the fact that the tramways belonged to the people of London, and assured the Council that the Highways Committee was doing its best to develop the undertaking for the benefit of the community.

TRAMWAY EMPLOYEES AND THE 1919 AGREEMENT.

The Manchester tramway employees, at a meeting considered the employers' proposals for revising the National Agreement of 1919. There was an unusually large attendance, and the following resolution was passed :—"This meeting of Manchester tramwaymen strongly resents any revision of the 1919 Agreement that has for its object a retrogressive step, and pledges its utmost support to the Executive Council in any action they may deem necessary to resist a violation of the principle of the Agreement, which includes the whole of the operation and maintenance staff engaged in the tramway industry. The meeting also resolves that the delegates in special conference be asked to notify the General Council of the Trade Unions Congress, requesting their support at all costs." An official of the men's union afterwards stated that the men were undoubtedly ready to go to the length of a strike in resisting the proposed revision of the Agreement. Sheffield tramway employees have also decided to oppose the employers' proposals.

MISCELLANEOUS NEWS AND NOTES.

Tramways and Light Railways Association Summer Congres is to be held this year at Bournemouth.

New Track at Burnley.—It is proposed to lay 200 yards of tramway track as soon as the necessary sanction is received from the Government authorities.

Halifax Track Re-construction.—The tramways manager, Mr. Ben Hall, has been instructed to begin the re-laying of the track between Nursery Lane and Illingworth.

Motor Vehicles for Police.—Staffordshire Standing Joint Committee has decided to provide 18 motor vehicles for the use of the police superintendents. The estimated cost is £5,400.

The 48-Hour Week.—The tramway employees of Bury Corporation, Heywood and Radcliffe propose to cease work rather than agree to the employers' proposals in regard to the 48-hour week.

Proposed Motor Omnibus Service for Burnley.—A Sub-Committee of the Burnley Tramways Committee has been instructed to report on the proposal to provide a motor omnibus service in various parts of the borough.

Track Doubling at Manchester.—Manchester Tramways Committee propose to apply to the Ministry of Transport for sanction for the doubling of the tramway track over the canal bridge in Hulme Hall Lane, and in Stanley Grove.

Track Construction at Bradford.—The Bradford Corporation Finance Advisory Sub-Committee have approved the proposal that applications should be made for sanction to borrow £17,242 and £19,000 respectively for tramway track in Thornton Road, Listerhills, and the new road at School Green.

Transport Ministry and Edinburgh Electrification Plans.—A deputation from Edinburgh Corporation was received at the Ministry of Transport on Tuesday with reference to the electrification of the City tramways. The Corporation, it will be remembered, are seeking the authority of the Ministry to erect centre poles in Prince's Street, but are meeting with considerable opposition, and it is urged that a public inquiry should first be held.

Bradford Management and the Tramways.—At a recent Government inquiry into Bradford Corporation's application for borrowing powers, the tramways manager, Mr. R. H. Wilkinson, said that owing to the increased cost of tramway track construction, 75 per cent. of the lines would eventually have to be abandoned unless some form of transport cheaper than the tramway car was adopted. The city engineer stated that no ill effects had been noticed on the roads over which the Corporation were running railless trolley vehicles.

Dover and Railless Traction.—The Tramways Committee have received reports from a deputation which they sent to inspect the railless trolley systems of York, Leeds and Bradford, with a view to a similar method of traction being adopted in certain parts of Dover. The general manager of the tramways (Mr. E. H. Bond) reported that the weight of evidence obtained was in favour of railless as "a sound, practical proposition." He estimated that the total cost of installing such a system in Dover, with three cars, would be £9,850, or with four cars, £12,300. The committee decided to defer consideration of the matter for two months, and in the meantime to carry out necessary repairs to the tramway track.

Dublin United Tramways Meeting.—Speaking at the annual meeting of Dublin United Tramways Company, the chairman, the Rt. Hon. L. Waldron, said that by agreement with their employees the company had recently decided to reduce their wages by 4s. per week in two instalments of 2s. on February 1 and March 1 respectively. He added that the management thought the reduction should have been 5s., but in order to produce peace and good-will they yielded to the lesser reduction. The chairman paid a tribute to the "great patience and courtesy" of the drivers and conductors, to the willing and able support accorded by the higher officials to the directorate, and to the loyalty of the whole staff throughout a very trying year.

Tramcars or Omnibuses? Transport Ministry's View.—In Parliamentary papers of February 13, Major Glyn (Clackmannan and East Stirlingshire) asked the Ministry of Transport whether, in the opinion of their expert advisers, motor omnibus traffic was preferable to tramcar traffic in all congested cities and areas ; and whether the overhead trolley system had any considerable merit in comparison with the slot system. The Secretary to the Ministry (Mr. Neal) replied as follows :—The first part of the question cannot be answered without reference to local circumstances. As regards the latter part, if by "slot system" my hon. and gallant friend means the conduit system of electric traction, the overhead system is, I understand, the cheaper in respect of cost of installation and maintenance.

The High Value Penny.—The Executive Council of the Municipal Tramways Association at their meeting on February 11, passed the following resolution :—"That in the opinion of this Executive Council the adoption of Mr. Harry Allcock's scheme, *viz.*, to increase the value of a penny by making ten pennies equivalent to one shilling instead of tenpence as at present, would be advantageous to tramway authorities." It may be pointed out that the adoption of the high value penny would be advantageous not only to the owners of tramway undertakings, but also to the many passengers who now have to pay, in some cases, a minimum of 1½d., because the present value of the penny is too low to cover the cost of operation, and there is no other convenient coin which tramway authorities could adopt as a minimum fare.

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Electrification of Chatham Railway.—The managing committee of the South-Eastern and the London, Chatham, and Dover Railway Companies in their annual report for 1921 state that, after spending much time considering means of providing adequate accommodation for their traffic, they have decided that the only method of securing this is to introduce electric traction. They considered it expedient to avail themselves of the powers conferred by the Trade Facilities Act, 1921, and have approached the committee appointed under the Act with the object of obtaining capital under Government guarantee. A meeting of the Industrial Group of the House of Commons is to be held on Monday next to consider the electrification of railways in the London area. The scheme contemplated, it is reported, would involve an outlay of £17,000,000, extending over three years, which would mean the employment of 20,000 skilled men for the whole of that period.

"Plying for Hire": Important Decision.—In the Divisional Court on Monday, the Lord Chief Justice delivered considered judgment in an appeal which involved the question whether motor coaches running between London and seaside resorts were coaches plying for hire within the meaning of the Metropolitan Public Carriage Act, 1869, and were accordingly required to be licensed under that Act. The appeal was against the decision of the Westminster magistrate, who decided that these motor coaches did not require to be licensed under the Act, as the people carried were in the nature of private parties. The Lord Chief Justice said the magistrate found that when the coach was standing in the street concerned, no member of the public could have obtained a seat if he had not previously booked elsewhere. The process of soliciting was then over, and the driver was merely receiving passengers who had already booked. On this ground alone the magistrate was right in refusing to convict. The appeal was dismissed with costs.

Railways and Motor Transport.—A statement was issued on Wednesday by the railways in the North-Western and Midland Group who are seeking Parliamentary powers to convey goods traffic by road. The powers asked for in the Bill, it is pointed out, which is to be introduced in the present session, are similar to those already granted by Parliament to the Great Eastern and the North-Eastern Railways. The railway companies feel, the statement proceeds, that the enormously increased use of the roads by mechanically-propelled vehicles has opened up a new vista of transportation, and they contend that it is reasonable, not only in their own interests, but in the interests of the public generally, that they should be allowed to keep abreast of the times and to render the best service possible to the trading community. In view of the large interests affected, represented by the motor manufacturing trade, the railway companies are not seeking power to manufacture their own vehicles, and powers are not sought in respect of passenger traffic.

PERSONAL.

Mr. A. Nicklin has been appointed electrical and mechanical engineer of Swindon Corporation at a commencing salary of £500 per annum.

Sir John Timpson, K.B.E., K.S.T., O.R.S., was entertained at luncheon at the Hotel Russell on Friday of last week by the Executive Council of the Municipal Tramways Association, of which he is vice-president. Alderman R. Mayne, of Newcastle, president of the Association, was in the chair, and all members of the Council were present, with the exception of one or two who were unavoidably detained. The company gathered to express to Sir John their gratification at the honour which had recently been conferred upon him, and the remarks of Mr. Mayne and other speakers testified to the high esteem and affectionate regard in which he is held by his colleagues. Sir John has had a long and distinguished municipal career at Portsmouth; in fact there is scarcely a department of municipal activity in which he has not borne a useful part. As chairman of the Tramways Committee for many years he has been largely instrumental in the development of that undertaking. Thrice mayor of Portsmouth during the crucial years of the war, his services to the country in receiving foreign representatives, and in many other activities, have indeed well merited a knighthood of the British Empire.

Mr. Ernest Hatton has tendered his resignation to the Transport and Electricity Committee of Newcastle-on-Tyne as general manager and engineer of the City's tramways. Mr. Hatton's health has for a long time not been good, and he has decided to take a long rest. Mr. Hatton's withdrawal from the position he has so ably filled for 17 years will be a great loss to Newcastle. When he came from Salford the Newcastle tramways were in a very unsatisfactory position, but under his management they soon became a profitable undertaking, and they have contributed considerable sums to the relief of rates. The system has been extended under his direction, and prior to the comparatively recent rearrangement of fare stages the fares were among the lowest in the country. Owing to the position of Newcastle, the maintenance of the service during the war involved exceptional difficulties. The staff was, of course, very largely depleted, and Mr. Hatton organised a scheme of volunteer drivers and conductors to assist in carrying the thousands of munition workers to the factories and home again in the evening. Mr. Hatton's abilities are appreciated throughout the tramway field, and only recently his advice was sought by some continental tramway undertakings in connection with plans for handling large volumes of traffic at holiday times, which has been a feature of the Newcastle management.

LONDON UNDERGROUND GROUP REPORTS.

REPORTS FOR 1921.

LONDON ELECTRIC RAILWAY.—There is an increase in receipts of £223,091 at £2,040,010, but expenses are down £18,523 at £1,368,771. Net receipts are therefore up £241,614 at £671,239. Miscellaneous net receipts were £136,804, and the balance from last account £22,350. After deducting £295,544 for interest and rentals and £65,000 for reserve and meeting preference dividend there is enough to pay 3¼ per cent. on the ordinary and carry forward £39,744. Capital expenditure came to £135,905.

CENTRAL LONDON RAILWAY.—Total receipts aggregate £661,479, an increase of £83,096, but expenditure was reduced by £16,704 to £468,428. Net receipts are up £99,800 at £193,051, and miscellaneous receipts come to £68,071. The balance from last year was £15,161. Interest and rentals absorb £46,039, and £29,000 is placed to reserve, an increase of £9,000. The preference dividend absorbs £21,600, and 4 per cent. is paid on the ordinary and preferred ordinary stocks, leaving £59,644 to be carried forward. The capital expenditure came to £8,185.

LONDON GENERAL OMNIBUS.—An expansion of £566,241 is shown in receipts to £7,500,572, but an increase of expenditure of £260,844 at £6,936,082. Miscellaneous receipts came to £183,552. Interest and rentals reached £152,474, and £335,000 was appropriated to reserve, an increase of £50,000. The dividend is 8 per cent., free of tax, against 5 per cent., free of tax, and £67,928 is carried forward, against £58,843 a year ago. The expenditure on capital account was £664,402. The company now works 685 road miles.

METROPOLITAN DISTRICT RAILWAY.—In consequence of the Government control of the company's railway during 1920, certain figures for that year are not comparable with those for 1921 and are omitted. The net receipts for 1921 show an improvement of £164,041, but as miscellaneous net receipts are smaller by £41,328, the gain in total net income is limited to £122,713. After deducting fixed charges, which show the small decrease of £611, and placing £65,000 to reserve, against £45,000 only last year, the available balance, including the amount brought in from 1920, is £291,330, an increase of £101,763. The full dividend of 5 per cent. is paid on the second preference stock, against only 3 per cent. for 1920, and the ordinary stock receives 1 per cent., the first distribution on that stock since 3-16 per cent. was paid for 1882.

CITY AND SOUTH LONDON RAILWAY.—With an increase in receipts of £19,008 and a decline in expenses of £20,470, the net receipts show a gain of £39,478 to £145,558. Miscellaneous net receipts are also up £2,000, and as fixed charges are down £2,208, the available amount, including the slightly smaller balance brought in, shows an increase of £43,356 at £151,876. The sum of £36,000, or £11,000 more than last year, is placed to reserve. The consolidated ordinary dividend is raised from 1½ per cent. to 3¼ per cent., and the "carry forward" from £18,820 to £25,276.

FINANCIAL.

W. T. Henley's Telegraph Works Co., Ltd., announce a final dividend on the ordinary shares of 2s. per share, less tax, making 3s. per share for the year, less tax.

London and Suburban Traction Group.—The receipts for the week ended February 11 were £44,092 (previous week £45,051). The aggregate from January 1 to date amounts to £264,847.

London Underground Group Receipts.—The receipts of the Common Fund Companies for the week ended February 11 amounted to £204,433 (previous week £204,824). The aggregate from January 1 to date amounts to £1,226,654.

Kirkcaldy Corporation propose to borrow £93,000 for new plant as recommended by the Tramways Committee. This sum includes £7,000 already spent and £4,000 for direct-current feeders.

Liverpool Overhead Railway Company have announced a dividend on the preference shares at the rate of 5 per cent. per annum, less income tax, for the year ended December 31, 1921. The annual meeting will be held on February 28.

The Bank Rate.—The Bank rate was reduced on Thursday to 4½ per cent., the lowest figure which has been reached since July, 1914, when the rate was put up from 4½ per cent. to 8 per cent. The reduction may be expected to have a favourable influence on trade and industry.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended February 15 amounted to £89,255, a decrease of £9,155 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year) to February 15 (46 weeks) the total receipts were £4,490,222, an increase of £209,956 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of thirty-four of the principal tramway undertakings in the United Kingdom for the week ended February 4 give total receipts of £354,139, or £27,821 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £181 15s. 11d. per mile of single track, and last year at the rate of £196 1s. 6d., thus showing a decrease for the week of £14 5s. 7d. per mile open.

The Electro-Mechanical Brake Company, Ltd., of West Bromwich, have received an order through the English Electric Company, Ltd., for 75 car sets, and through the Metropolitan-Vickers Electrical Company, Ltd., for 50 car sets of E.M.B. unbreakable resistances required for the 60 h.-p. equipments of the new London County Council cars.

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TENDERS INVITED.

READING CORPORATION TRAMWAYS AND MOTORS.

Uniform Clothing.

Tenders are invited by March 1 next for supply of Uniform Clothing, including Mackintoshes, required during the year ending March 31, 1923.

Tender Forms, and all particulars may be had from the undersigned.

J. M. CALDER,
General Manager and Engineer.

Mill Lane, Reading.
February 10, 1922.

BOROUGH OF SWINDON.

Supply of Tramway Uniforms.

The Corporation of Swindon invite Tenders for the supply of Uniform Clothing for the traffic staff for the year ending March 31, 1923.

Samples of the articles of Uniform required may be inspected at the Electricity and Tramways Offices, Corporation Street, Swindon, and copies of the general conditions and specification may be obtained on application to the Tramways Manager, Mr. T. Medcalf, at the above address.

Tenders, sealed and endorsed "Tenders for Tramway Uniforms," and addressed to the undersigned, to be delivered at the Town Hall, Swindon, not later than 12 o'clock, noon, on Saturday, March 4, 1922.

ROBT. HILTON,
Town Clerk.

Town Hall, Swindon.
February 14, 1922.

BOROUGH OF SWINDON.

Advertising on Tramcars.

The Corporation of Swindon invite Tenders for the right of advertising on their Tramcars for a period of three or five years.

Particulars and Conditions may be obtained on application to the Tramways Manager, Mr. T. Medcalf, Electricity Works, Corporation Street, Swindon.

Tenders, sealed and endorsed "Tenders for Advertising," and addressed to the undersigned, to be delivered at the Town Hall, Swindon, not later than 12 o'clock noon, on Wednesday, March 1, 1922.

ROBT. HILTON,
Town Clerk.

Town Hall, Swindon.
February 14, 1922.

BOROUGH OF ASHTON-UNDER-LYNE.

Second-Hand Tramcars for Sale.

Tenders are invited for the purchase of Sixteen Single-deck, Single Truck Box Cars, and Two Double-Deck Single-Truck Open top Cars. Equipments and trucks are as follows :—

No. for Sale	Motors	Controllers.	Trucks.
16	G.E. 52	B.T.H. K10 & B13	Peckham
2	Brush 1002	Brush HD2	Peckham

The cars will be sold either singly or any number, and alternative offers will be considered for the separate sale of one or any of the trucks, equipments or car bodies.

The above may be seen at the Depot by prospective purchasers at any time.

Tenders, endorsed, "Chairman, Tramways Committee," should be sent to the undersigned not later than March 11, 1922.

E. N. O'HARA,
Town Clerk, Ashton-under-Lyne. Borough Comptroller.

COUNTY BOROUGH OF WIGAN.

Electricity Department.

Turbo-Alternator, Condensing Plant, etc.

The Wigan Borough Council are prepared to receive Tenders for Steam Turbine, Three-phase Alternator and Exciter of 5,000 kilowatts capacity, and Surface Condensing Plant.

Copies of the General Conditions, Specification and Form of Tender may be obtained from Robert Owen, Esq., Manager of the Department, Bradford Place, Wigan, on payment of a deposit of five pounds, which will be refunded on receipt of a bona-fide Tender.

The Corporation will be prepared to consider separate Tenders for the different sections of the Plant in accordance with the Conditions attached to the Specification.

Tenders must be in the form attached to the Specification, and must be delivered to me at the Municipal Offices, King Street West, Wigan, not later than 11 o'clock in the forenoon, on Monday, the 13th day of March, 1922, in sealed envelopes endorsed "Electricity Department; Tender for Generating Plant."

The Corporation do not bind themselves to accept the lowest or any of the Tenders.

WILLIAM HENRY TYRER,
Town Clerk.

Wigan, February 16, 1922.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	Feb. 8	3,421	3,046	— 375	36¾	129,712	— 11,699
" Motor Buses	" 8	55	142	+ 87	36¾	8,899	+ 7,887
Ayr Corporation ..	" 11	537	460	— 77	39	28,541	— 2,020
Barrow Corporation ..	" 11	854	612	— 242	45	37,640	— 3,138
Belfast City	" 10	10,902	11,852	+ 950	45	565,963	+ 50,600
Birkenhead Corporation	" 12	2,518	2,373	— 145	44¾	118,170	— 13,091
" Motor Buses	" 12	361	466	+ 105	44¾	30,267	+ 11,525
Birmingham Corporat'n	" 4	32,842	27,961	— 4,881	44	1,291,235	— 111,017
" Motor Buses	" 4	1,855	1,637	— 218	44	87,353	— 1,344
Blackburn Corporation	" 8	2,328	2,094	— 234	45¾	108,261	— 9,935
Bradford Corporation..	" 11	13,761	12,209	— 852	45	617,574	+ 11,462
Burnley Corporation ..	" 11	3,516	3,257	— 259	..	..	..
Burton-on-Trent Corp.	" 12	593	560	— 33	45	28,240	+ 465
Bury Corporation ..	" 12	2,384	2,211	— 173	45¾	110,169	— 4,889
Chatham & District ..	" 2	1,629	1,544	— 85	5	6,796	— 1,247
Chesterfield Corporat'n.	" 6	623	571	— 61	45	26 344	— 536
" Motor Buses	" 6	863	660	— 203	45	34,147	— 2,172
Derby Corporation ...	" 11	2,154	1,927	— 227	45	97,145	— 6,740
Dundee City ...	" 8	3,186	2,940	— 246	38¾	123,344	+ 5,412
East Ham Corporation	" 11	2,019	2,000	— 19	45¾	95,723	+ 2,057
Edinburgh Corp. Trys.	" 5	..	10,982	..	38	483,042	+ 5,369
" Motor Buses	" 5	..	3,222	..	38	135,836	..
Glasgow Corporation ..	" 11	44,811	42,912	— 4,899	36¼	1,653,435	+ 5,904
Glossop (U.E. Sup. Co.)	" 11	225	214	— 11	6	1,366	— 67
Halifax Corporation ..	" 7	4,234	3,719	— 515	43½	192,757	+ 1,141
" Motor Buses	" 7	111	67	— 44	43½	3,470	— 1,545
" Railless Cars	" 7	..	40	..	29	1,563	..
Huddersfield Corporatn.	" 11	5,176	4,701	— 475	46	238,647	+ 8,899
Ilford U.D. Council ..	" 11	1,253	1,388	+ 135	46	67,939	+ 9,651
Ipswich Corporation ...	" 11	766	678	— 88	45	38,923	— 4,941
Isle of Thanet ...	" 8	487	467	— 20	18	11,598	+ 1,059
Kilmarnock Corporat'n	" 11	356	324	— 32	38¾	13,999	— 400
Leicester Corporation..	" 11	6,448	6,863	+ 415	6	42,356	+ 3,059
Liverpool Corporation	" 11	25,956	26,960	+ 1,004	6	171,304	+ 10,417
London County Ccl. ..	" 15	98,410	89,255	— 9,155	46	4,490,222	+ 209,956
Maidstone Corporation	" 9	386	354	— 32	44	21,356	— 484
Manchester Corp. ..	" 11	37,632	35,786	— 1,846	45	1,746,937	+ 184,927
Newcastle-on-T. Corp.	" 4	11,352	10,358	— 994	44	495,002	+ 6,733
Nottingham Corp.	" 9	7,204	7,194	— 10	45	307,537	— 40,986
Oldham Corporation ...	" 12	4,485	4,422	— 63	47	220,756	+ 3,067
Preston Corporation ...	" 8	1,826	1,732	— 94	44¾	85,656	+ 3,439
Reading Corporation	" 9	1,455	1,392	— 63	45	71,224	— 3,610
" Motor Buses	" 9	234	277	+ 43	45	15,269	+ 3,363
Rotherham Corporation	" 13	2,747	2,162	— 585	45	101,897	— 18,623
Salford Corporation ..	" 12	10,558	9,954	— 604	44½	483,609	+ 22,221
Sheffield Corporation..	" 12	20,543	17,970	— 2,573	45¾	880,346	— 66,497
Southampton Corp. ..	" 8	2,905	2,882	— 23	45	133,270	— 8,714
" Motor Buses	" 8	182	100	— 82	45	6,905	— 4,150
Southend-on-Sea Corp.	" 15	1,589	1,773	+ 184	46	113,887	+ 7,306
South Shields Corp. ..	" 11	1,854	1,588	— 266	46	76,934	— 10,700
St. Helens Corporation	" 7	2,044	1,550	— 494	45	80,322	— 13,522
Sunderland Corp. ..	" 12	2,727	2,370	— 357	45	138,482	— 20,600
Swindon Corporation..	" 8	340	313	— 27	44¾	17,654	+ 225
Tyneside Trys., Trds...	" 1	1,186	831	— 355	5	3,633	— 1,719
Wallasey Corp. ..	" 11	2,527	2,294	— 233	45¾	126,192	+ 7,277
" Motor Buses	" 11	123	193	+ 70	45¾	10,723	+ 2,956
Walsall Corporation ..	" 11	1,853	1,563	— 290	46	74,048	— 8,086
" Motor Buses	" 11	1,316	883	— 433	46	42,263	— 11,029
Walthamstow U.D.C....	" 13	1,779	1,622	— 157	45	91,894	— 416
Warrington Corp. ..	" 9	1,028	993	— 35	45	44,906	— 360
West Ham Corp. ..	" 9	5,888	5,486	— 402	45	265,631	+ 3,329
Wolverhampton Corp.	" 8	2,278	2,137	— 141	45	104,998	— 4,200
" Motor Buses	" 8	679	635	— 44	45	29,434	+ 8,800

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1920 21.	1921-22.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..	Feb. 11	£76,472	82,101	6	£489,368	+ 11,591
Ballarat & Ben. (4 wks.)	Dec. 4	4,601	4,762	36	40,287	+ 2,686
Brazilian Traction (Mlrs)	Nov.	12,199,000	14,555,000	48	155,462,000	+ 33,156,000
Brisbane	Jan.	46,280	48,790	4	48,790	+ 2,510
British Columbia $	Dec.	917,668	940,113	26	5,192,915	+ 175,554
Buenos Aires Lacroze ..	Jan.	61,111	61,198	30	404,817	+ 7,420
Burmah Tr. & Lght. Rs.	Jan.	50,035	59,362	5	350,747	+ 41,984
Calcutta .. Rs.	Feb. 11	* 159	107,938	6	613,764	+ 242,588
Cape Town	Dec.	29,768	31,521	..	..	..
Carthagena & Herrerias	Jan.	3,877	3,075	4	3,075	— 802
Cordoba	Dec.	19,299	22,641	39	207,992	+ 29,564
East India	Jan.	4,299	4,080	26	24,834	— 606
Kalgoorlie ..	Nov.	2,969	2,419	48	24,944	— 8,728
La Plata ..	Nov.	5,573	6,453	48	58,098	— 3,652
Madras (2 weeks) Rs.	Jan. 31	* ...	54,390	4	105,239	— 67,041
Manila .. .. $	Dec.	316,467	315,599	52	3,681,011	+ 262,605
Montevideo	Jan.	50,863	32,634	13	132,190	+ 11,454
Para	Jan.	24,231	22,966	9	45,626	— 2,858
Pernambuco	Feb. 12	4,789	3,626	6½	22,433	— 7,013
Port Elizabeth	Dec.	8,185	8,344	..	..	..
Rangoon .. Rs.	Jan.	122,558	137,850	4	137,850	+ 15,292
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Jan. 7	9,969	14,882	1	14,882	— 4,913
Winnipeg .. $	Nov.	477,957	477,880	48	4,910,971	+ 156,466

* Strike of employees.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2

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LONDON, FEBRUARY 25, 1922.

"TOO MANY COOKS."

The unwisdom of a town council acting contrary to the considered advice of its tramways committee has often been demonstrated. The average member of a town council who does not happen to be specially concerned with the operation of tramways has neither the time nor opportunity, as a general rule, of qualifying himself to form accurate judgments in regard to such a matter, for instance, as the financial effect of an alteration of fares. Such a member should, however, be capable of appreciating that the probable result of an increase or a reduction in fares can only be visualised after a very careful study of the fluctuations of tramway traffic from day to day under varying conditions. Even the average member of a tramway committee finds it desirable in most cases to rely on the advice of the management, who constantly have this problem before them. The fact is, indeed, that, notwithstanding this constant study, the managements have no easy task in finding the happy medium which, while offering the maximum of convenience and service to the public, provides the revenue necessary to make the undertaking self-supporting. The case of Birmingham strikingly illustrates the disadvantage of interference by a council with the decisions of the tramways committee in respect of fares. Last month the City Council instructed the Committee to arrange for the revival of minimum penny fares at the earliest possible date, in spite of the warning by the chairman of the committee that such action would jeopardise the financial stability of the undertaking. The Committee had no option but to comply, with the result that penny fares were made operative on February 6. The sequal is illuminating if unfortunate, and its lesson might profitably be taken to heart by the Council. For the six days following the reversion to these fares, the gross number of penny and three-halfpenny tickets issued was 1,149,846, or a gross increase of 15,850 over the number of three-halfpenny tickets sold in a corresponding period immediately before the change. This, however, represented a net loss in cash of £765 12s. for the six days. It is but fair to point out, however, that these figures refer only to an early period in the trial of the new fares. No doubt Birmingham City Council was influenced by public clamour, but there again the average voter can even less be expected to foresee the final result of his natural desire for reduced tramway fares. It is not inopportune at the present moment to recall that during the difficult period of the war the Birmingham tramways management exercised wise judgment in regard to its fare policy, and it is unfortunate that its advice is not being acted upon at present. Some of the critics are now loudly drawing attention to the successful use of penny fares in other cities. Here again is an instance of the ease with which wrong conclusions may be drawn from experience elsewhere. Everyone knows the local difficulties with which the Birmingham management has to contend. Consequently, what might be possible in Glasgow or Manchester may not be feasible in Birmingham.

QUESTIONS IN PARLIAMENT.

MINISTRY OF TRANSPORT.—On Monday, Mr. G. Locker-Lampson asked the Parliamentary Secretary to the Ministry of Transport whether he was making arrangements to transfer the functions of his department to the Board of Trade in accordance with the recommendation of the Geddes Committee. Mr. Neal, in reply, said that the proposed transfer, with the necessary incidental changes recommended, was receiving the consideration of the Government. He added, in reply to Mr. Marshall Stevens, that legislation would be necessary before the change could be made.

EDINBURGH TRAMWAY PLANS.—Major Glyn on Monday asked the Secretary to the Ministry of Transport whether, if application were made by the City of Edinburgh Council for leave to set up central standards for overhead trolley electric tramways throughout the length of Princes Street and other parts of that city, he would see that no leave be granted until the opinion of the residents of Edinburgh had been ascertained and careful inquiry made on the spot into the whole matter. Mr. Neal, in reply, said that the scheme for equipping the Edinburgh tramways for electric traction, which involved the erection of central standards in Princes Street, had been submitted for approval. Any objections communicated to the Ministry by residents of Edinburgh would be carefully considered before a decision was given, and if it seemed necessary after such consideration an inquiry would be held. (It has since been decided to hold an inquiry, as stated on page 108.)

REGULATIONS FOR PASSING TRAMCARS IN LONDON.—Mr. Neal, replying to Mr. Gilbert, said he had received representations from the London County Council as to the danger of other traffic passing tramcars which have stopped for the purpose of landing or embarking passengers at regular stopping places fixed by the police for these purposes, and it had been suggested that a regulation should be made requiring vehicles passing on the near side of a stationary tramcar to slow down while doing so. It was doubtful whether the Ministry of Transport had power to make such a regulation, and in any case it seemed undesirable to do so. It would be difficult to enforce it effectively in view of the large number of tramcar stopping places, and in the opinion of the police authorities, whom he had consulted, it would probably lead to more accidents than would be prevented. Sir H. Brittain inquired whether, seeing that the suggested rule was being carried out throughout the whole of the British Empire and the United States, it should be difficult to enforce it in London. Mr. Neal replied that the police had a very clear view that it would lead to more accidents than it would prevent, and there was, moreover, very great doubt whether there was any legal authority in the Ministry to interfere. He did not feel it incumbent upon him to take any action. Sir F. Hall asked whether Mr. Neal remembered that he sat on the Select Committee with regard to the case of the general condition of London traffic, and did he propose to take any steps to carry out the suggestions of the report of that committee? Mr. Neal replied that as to the Select Committee presided over by the late Mr. Kennedy Jones, M.P., it had not been found possible to bring its recommendations into operation. They would need legislation, and he thought the whole question of dealing with London traffic was inextricably mixed up with questions of local government in London.

PETROL TAX.—Mr. Young, in reply to a question of Sir R. Blades, said the collection of the petrol tax, which was abolished as from January 1, 1921, was spread over a very large number of Customs and Excise officers, who performed the work in conjunction with numerous other duties. It would not be possible, without making an exhaustive inquiry, to find out the aggregate cost of this work.

London "Safety First" Council.—The fifth annual general meeting was held at the Mansion House on Wednesday, the Lord Mayor presiding. The annual report stated that the "Freedom from Accidents" competition for drivers had during the twelve months grown in popularity and the number of entrants had advanced to nearly 7,000. Substantial advance had been made in the campaign for a "Keep to the left" rule of the footpath in that the Minister of Transport had approved of its recommendation by the Council to local authorities.

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THE TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

ANNUAL CONGRESS.

Particulars are given in the Journal of the Tramways and Light Railways Association for February of the arrangements for the annual congress of the Association, which, as mentioned in our issue of last week, will be held at Bournemouth. The date has now been fixed for Thursday and Friday, June 22 and 23. Papers to be read include one on "Bournemouth Corporation Tramways," by Mr. I. Bulfin, general manager; "Railless Traction," by Mr. E. M. Munro, and "Modern Improvements in Tramway Rolling Stock," by Mr. C. J. Spencer.

As this is the first congress to be held under pre-war conditions since the congress at Newcastle in July, 1914, it is anticipated there will be a large attendance. The Mayor of Bournemouth and the Tramways Committee, who have invited the Association to hold their congress at Bournemouth, have placed a suitable hall at their disposal for the business meetings, either at the Town Hall or at the Municipal College. The Mayor and Corporation will entertain the members at luncheon on either Thursday or Friday, and the Association's annual dinner will be held on the other evening.

L.C.C. TRAMWAY MATTERS.

The Special Committee on Organisation of the Council's Services reported at the Council meeting on Tuesday in regard to arrangements for giving effect to the resolutions passed by the Council on January 24 as to the certification of accounts, checking of stock and tramway stores. They also submitted certain recommendations. The total saving in numbers of the Council's staff as a consequence of these regulations would be 104, or, including the architect's department, 159. There will be an immediate saving of about £27,200 a year in consequence of the reduction of temporary staff, and an eventual saving of £43,500 a year, and, in addition, a saving of £900 a year now spent in paying wages by postal order. The several heads of departments will be held directly and solely responsible: (1) For the certification and checking of all invoices for payment; (2) the complete preparation and checking of wages sheets; (3) the restriction of expenditure to the amount voted for any particular purpose; and (4) the collection of monies due to the Council relating to the work of the departments. The payment of wages will be the responsibility of the heads of the executive departments concerned. Clerical assistants, etc., in the various branches of the tramway department and tramway employees employed at the head office, depots and on the tramway tracks, numbering about 15,510, will be paid by pay clerks in the tramways department. By a resolution adopted on January 24, certain work now done in the stores and accounts section of the tramways department relating to tramway stores will pass to the chief officer of stores. The arrangements proposed by the general manager of the tramways department for furnishing to the stores department information as to requirements have been approved. These arrangements include a provision to ensure that stocks are rigidly controlled with a view to preventing the accumulation of unnecessary quantities of material. Thirty positions on the office staff of the tramways department will be rendered unnecessary in consequence of the operation of the new arrangements. The work transferred will be absorbed in branches of the stores department at present doing similar work. The change-over of work from the tramways department to the stores department will be effected in stages and completed by April. The permanent staff of the tramways department now engaged on the work will be utilised to fill vacancies in other branches of the department.

MISCELLANEOUS NEWS AND NOTES.

Omnibuses for Leeds.—The Tramways Committee have decided to purchase two small motor omnibuses, to be used in linking up Farnley with the Tong Road and Kirkstall tramway routes.

All-Night Car Service at Glasgow.—A report on this service presented by the general manager of the tramways (Mr. J. Dalrymple) shows a deficiency on the first year's working of £1,098.

New Spanish Tariff.—The Board of Trade announces that a translation of the new Spanish tariff, which became fully operative on February 16, has been issued as a supplement to the *Board of Trade Journal* of Thursday.

Tramway Extensions at Cardiff.—The Cardiff Tramways Committee has appointed a sub-committee to consider the question of tramway extensions in various parts of the city. It is not, however, intended to proceed with any extensions at present.

Proposed Single-Deck Cars for Edinburgh.—The Corporation Tramways Committee have considered the adoption of single-deck cars for use on certain routes, and the general manager (Mr. R. S. Pilcher) was instructed to prepare a report and plans.

A New Trolley Omnibus.—The Associated Equipment Company, of Walthamstow, has constructed a trolley omnibus which has been tried with very satisfactory results on several tramway routes in the London district, current being taken from the tramway overhead wires.

Later Service at Birmingham.—The Birmingham Tramways Committee have decided to extend the hours during which the tramcar and omnibus services are run, so that the last cars will leave the city termini at 11.30 p.m., instead of 11 o'clock. The committee also decided to give a trial on the Harborne route to an omnibus of the "K" type, now in use in London, which seats 54 passengers instead of the 34 accommodated by the present vehicle.

No Fare Reduction at Salford.—Although the price of electrica energy to Salford Corporation tramways has been reduced, it was stated at a meeting of the Council that it would be impossible to make any reduction in fares, as the receipts were some £1,200 a week lower than a year ago.

Preston Omnibus Loan.—The Ministry of Transport has sanctioned the raising of a loan by Preston Corporation of £4,765 for the purchase of motor omnibuses, to be repaid in six years. The Preston Watch Committee are discussing with omnibus proprietors the question of stands for motor omnibuses.

Newcastle Tramways Management.—Newcastle Corporation Transport and Electricity Committee, on Wednesday, received with regret the resignation of Mr. Ernest Hatton, general manager of the tramways (to which allusion was made in our last issue), and decided to place on record their high appreciation of his services. It was decided to advertise for a successor.

Sheffield Prize to Omnibus Driver.—Mr. A. R. Fearnley, general manager of Sheffield Corporation tramways and motors, having reported that omnibus driver A. Dunham has for the last four months of 1921 occupied the premier position in economy of petrol consumption, the Tramways Committee decided to make a grant of two guineas to show their appreciation of the economical way in which he performs his duties.

Princes Street, Edinburgh: Public Inquiry.—A public inquiry is to be held in Edinburgh by the Ministry of Transport regarding the proposal of the Town Council to erect centre poles in Princes Street as part of the tramway electrification scheme. This statement was made by Mr. Arthur Neal, Parliamentary Secretary to the Ministry, to a deputation from the Cockburn Association which waited upon him in London on Tuesday to oppose the Princes Street scheme on grounds of obstruction of traffic and public safety.

Electric Brakes.—At Scarborough recently two tramcar drivers were fined for exceeding the 4 miles speed limit downhill. Both asserted that it was far more dangerous to run downhill at 4 miles an hour than at 8 miles, as with the latter speed the electric brake could be used instead of the hand brake. The chairman of the bench said the magistrates felt that the attention of the Board of Trade should be drawn to the matter, so that if the defendants' statements were correct, some modification in the regulations could be made.

Tramway Extensions Proposed at Belfast.—At a meeting of the Tramways Committee on February 15, Councillor W. G. Turner presiding, it was decided to recommend the Council to promote a Bill in Parliament for the acquisition of additional lands and buildings contiguous to Bellevue Gardens (a pleasure resort maintained by the Tramways Committee). A scheme of tramway extensions was also discussed, and it was agreed that a special meeting should be held at an early date, and that the reports which were before the committee about 18 months ago on this subject should be re-submitted, with revised estimates.

Southampton Tramways Extension.—The Swaythling tramway extension of the Southampton Corporation tramways, which consists of 3 furlongs 8.80 chains of double track, was inspected by Major Hall, of the Ministry of Transport, on Monday last, and was opened for service on Thursday. In addition to the Swaythling extension, a line was completed during the last few months to Millbrook. This line consists of 1 furlong 2.86 chains of double track, and 4 furlongs 2.42 chains of single track. The whole of the work has been carried out by the tramway department under the supervision of Mr. J. Dobson, general manager and engineer.

Newcastle Employees and 48-hour Week.—With the object of arriving at agreement in respect of the decision of Newcastle Corporation Transport and Electricity Committee to increase the hours of tramway employees from 44 to 48, a sub-committee conferred with representatives of the men on Monday. No further progress was, however, made. Alderman R. Mayne, chairman of the Transport Committee, afterwards stated that the employees had sought some financial compensation for the four hours in question, but this the sub-committee could not offer. The 48-hour week, which will give a half-hour later service at night, is to commence on February 26. The men have since resolved to cease work rather than agree to the extended hours.

Railway Electrification Schemes.—The electrification schemes proposed by the Southern Railways, which involve a joint expenditure of £17,000,000, spread over four or five years, were considered on Monday at a meeting of the members of the House of Commons forming the Industrial Group. Sir William Pearce presided, and representatives of the Federation of British Industries and of the British Commonwealth Union, and the general managers of the railway companies concerned were present. After a long discussion, Sir A. Richardson and Messrs. A. M. Samuel, F. Wise and P. Hannan were appointed as a committee to investigate the proposals submitted and to report to a meeting to be held in a week's time.

Scottish Tramways Association.—The first general meeting of the newly-formed Scottish Tramways Association was held in Glasgow on February 17. Mr. James Dalrymple (general manager of Glasgow Corporation tramways) presided. Appointments were made to various offices for the ensuing year and an Executive Committee was formed. Councillor J. G. Fraser (Dundee) moved that a clause be inserted in the constitution making it permissible for representatives of the tramway employees to be heard on any matter affecting their interests. The motion was defeated, but it was pointed out that one of the purposes of the Association was "to consider and discuss any matters that may be referred to it

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from time to time," which would cover this point. It was remitted to the Executive to consider recommendations regarding working hours and conditions of tramway employees in Scotland in substitution of the March 1919, agreement, in view of the fact that the Scottish "A" area of the Joint Industrial Council would soon cease to exist, owing to the numbers of resignations from that body which had recently taken place.

Fine Record for L.G.O.C. for 1921.—The London General Omnibus Company, having analysed its returns of working for 1921, announces a remarkable improvement upon a record of all-round efficiency already notable. As regards safe running, in actual numbers the year has shown a decrease of 10 per cent. in the gross total of accidents, and there was actually a decrease of nearly 60 per cent. in the number of fatal accidents, though in 1921 the company's omnibuses ran 1,200,000 miles more than in the previous year. To such a pitch of mechanical excellence have the vehicles been brought that the mileage lost through breakdowns only represented one-third of a mile per 1,000 miles r. n in 1921. This figure far surpasses all previous records.

Glasgow Tramways' Purchase Celebrated.—To mark the transference of the undertaking of the Airdrie and Coatbridge Tramways Company to Glasgow Corporation, a luncheon was recently given by Mr. P. N. Gray, a director of the Tramways Company. Among those present were: Provost Lavelle, Coatbridge; Provost Kennedy, Airdrie; Mr. James Dalrymple, general manager, Glasgow Corporation tramways; Bailie M'Whirr, convener, and Bailie Laing, sub-convener, of Glasgow Tramways Committee; and Mr. Archibald Robertson, ex-manager of the Airdrie and Coatbridge Tramways. At Coatbridge later in the day, Mr. Robertson, who has been general manager of the Tramways Company for 12 years, was presented by the staff with an inscribed silver rose bowl.

Electrification of the Chatham Railway.—Presiding on Thursday at the meeting of the South-Eastern and Chatham Railway, Mr. H. Cosmo O. Bonsor said the system of electrification which it was proposed to use differed from both those in use on the Brighton Line and the South-Western system, which railways are to be their partners in the Southern Group. It was one by which their trains could be taken through the Channel Tunnel and to Paris if necessary, which neither the Brighton nor the South-Western systems could do. Electrification must come, because it was impossible to run more steam trains during the busy hours than they were doing now. Dealing with the traffic of the past year, Mr. Bonsor said that they carried 83½ million passengers, or 14½ millions fewer than in 1920. There was a falling off in all classes, including workmen's.

London Underground Railways: Annual Meeting.— The annual meetings of several of the companies which form the London Underground group were held at the Caxton Hall, Westminster, on Thursday, Lord Ashfield presiding. The companies concerned (a summary of whose reports was given in our issue of last week) were: The Metropolitan District Railway, London Electric Railway, Central London Railway, City and South London Railway, and the London General Omnibus Company. Lord Ashfield made several important statements in the course of his speeches at each of the respective meetings. Referring to the scheme put before the Government last autumn for various extensions of the present railway system, approval of which was declined, he said that a revised scheme had been submitted to the special committee appointed by the Government, which, he hoped, would be acceptable.

London General Omnibus Company.—Presiding at the meeting of the London General Omnibus Company on Thursday, Lord Ashfield said that by the close of 1921, 926 K type omnibuses, each seating 46 passengers, and 205 S type omnibuses, each seating 54 passengers, were in service. During the year the seating capacity of the active fleet increased by 20 per cent. to 114,000. Experience of the S type omnibus had been good. During the first half of the current year large numbers would be added. During the year, 761,250,000 passengers had been carried, but there was a decrease of 6,700,000. There seemed to be a general lack of money, which restricted the number of rides, and until there was a restoration of prosperity they could not look for expanding traffic. The expenses for 1921 showed an increase of 4 per cent. Referring to their attempts to co-operate with the L.C.C. in providing motor omnibus services, he said that the loss on the working to meet the requirements of the L.C.C. had amounted to £22,000 in the course of the year. Through tickets between the Council's tramways and the omnibuses were issued at various points, but the number of these tickets sold in the year was only 260,000. They represented a very small proportion of the exchanging traffic, and it hardly seemed to merit the special facilities which had been offered. The company received as its share of the Common Fund £260,568, an increase of £147,131 over 1920. The payment of a final dividend of 3½ per cent. free of income tax, making 8 per cent. for the year, was agreed to.

The Metropolitan Municipal Tramway Managers and some personal friends entertained **Sir John Timpson, K.B.E.,** to dinner at the Sports' Club, St. James' Square, London, S.W., on Friday, February 17, in recognition of the honour recently conferred upon him. Mr. A. L. C. Fell, C.B.E., general manager of the London County Council Tramways, was in the chair, and those present included Sir John W. Courtis, Col. Sir T. A. Polson, M.P., the Rt. Hon. G. H. Roberts, M.P., Messrs. G. K. Bruce, T. B. Goodyer, L. E. Harvey, W. Murray, W. R. Spaven, L. Slattery, W. C. Ullmann, J. C. Williams, J. Beckett, A. Ellis, Lee Murray, H. Scholey, C.B.E., T. Petersham, A. H. Walton, G. L. Craven, W. E. Freir, H. E. Townell, G. Pinchard, H. S. T. Rogers, and A. M. Willcox.

PERSONAL.

Mr. W. H. Alabaster, city electrical engineer of Melbourne, has been authorised by the City Council to visit this country to inquire into electrical matters, new machinery, etc.

Mr. F. Bunney, an inspector at Westminster station, who is in his 70th year, will retire on February 28, after serving nearly 42 years with the Metropolitan District Railway.

Mr. A. E. Wray, formerly of Dick, Kerr & Co., Ltd., and subsequently of the English Electric Co., Ltd., has joined the staff of G. D. Peters & Co., Ltd., 3a, Dean's Yard, London, S.W.1.

Mr. T. M. Johnson, late of the English Electric and Siemens Supplies, Ltd., has been appointed branch manager of Drake and Gorham, Wholesale, Ltd., at their Liverpool Office, 61A, Bold Street.

Lieut.-Col. D. J. Smith, O.B.E., has been unanimously elected president of the Institution of Automobile Engineers for the Session 1922-23, and Messrs. H. G. Burford and L. H. Hounsfield, vice-presidents.

Mr. J. A. S. Wood, assistant manager of Manchester Corporation tramways, is about to retire on superannuation. He has been in the service of Manchester Corporation for about 45 years, and has occupied his present position for eight years.

Mr. J. M. McElroy, general manager of Manchester Corporation tramways, has tendered to the committee his resignation, which they have accepted with regret. Mr. McElroy has long suffered from ill-health, and it has been known for some time that he intended to retire. His withdrawal from active life will be received with great regret throughout the tramway industry, whose interests he has done so much to advance. Mr. McElroy entered the service of the Manchester Highways Department as a youth in 1880, when horse-drawn cars, owned by a private company, were in use. About 15 years later, when he had become principal assistant in the department, and preparations were being made for municipalisation o. the tramways, he was transferred to the Tramways Department and became secretary and adviser to the new committee. In 1901 he was appointed general manager of the undertaking, and has held the office with a distinction and ability which have won him a reputation not only in Manchester but throughout the country as an expert on tramway matters. Mr. McElroy has been a member of the Executive Council of the Municipal Tramways Association since its inception, and was president in the year 1906-7. He has studied the transport undertakings of several cities in Europe and the United States, and his report to the Corporation in 1914 on traffic problems attracted considerable attention. Mr. McElroy frequently acted in an advisory capacity to other tramway authorities, and had served as an arbitrator, on behalf of the Board of Trade, in tramway disputes. On the Joint Industrial Council he represented the Lancashire and Cheshire area. During the war Mr. McElroy served the Government in the Departments of the Admiralty, the Board of Trade and the Ministry of Munitions. The vacant managership will be filled after the Tramways Committee have been authorised by the Council to appoint a successor. The present salary is £1,500, with a bonus of £346.

We regret to record the death of **Mr. Wm. E. Kenway** at the age of 77 years. Mr. Kenway was formerly many years general manager of the Birmingham and Midland tramways.

FINANCIAL.

London Suburban Traction Group.—The receipts for the week ended February 18 were £45,430 (previous week £44,092). The aggregate from January 1 to date amounts to £310,277.

London Underground Group Receipts.—The receipts of the Common Fund Companies for the week ended February 18 amounted to £208,250 (previous week £204,433). The aggregate from January 1 to date amounts to £1,434,904.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended February 22 amounted to £90,826, a decrease of £8,867 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year) to February 22 (47 weeks) the total receipts were £4,581,061, an increase of £201,102 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of thirty-four of the principal tramway undertakings in the United Kingdom for the week ended February 11 give total receipts of £345,091, or £24,016 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £177 3s. per mile of single track, and last year at the rate of £189 9s. 7d., thus showing a decrease for the week of £12 6s. 7d. per mile open.

Sunderland District Electric Tramways.—After charging expenses of operation and administration for the year ended October 31, 1921, and providing for depreciation of rolling stock, etc., there remains a balance of £11,051. The sum of £1,542 was brought forward, and after deducting interest and sinking fund charges there is a balance of £4,993. A dividend of 5 per cent. on the first and second income bonds has been paid, leaving £928 to be carried forward. Athough the earnings increased, the working expenses weres till higher and the operating profit is lower by £3,753.

A Useful wall calendar of the tear-off variety has been sent to us by Hollings & Guest, Ltd., of Thimble Mill Lane, Birmingham. Each sheet shows the dates for one month, the figures being large and well printed on a light tinted ground. A view of one of the erecting shops showing a number of the firm's well-known presses in course of construction is a prominent feature of the calendar.

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CONTRACTS

St. Helens Tramways Committee have authorised their Motor Car Sub-Committee to purchase a light motor car.

J. W. Courtenay, Ltd., have been appointed sole advertising contractors for Nottingham Corporation omnibuses.

L.C.C. Tramways Special Track Work.—The continuance for a further period of 12 months of the arrangement between the London County Council and Hadfields, Ltd., for the supply of special track work has been sanctioned.

Douglas (I.O.M.) Town Council have decided to purchase a double-deck 48-seater Tilling-Stevens motor omnibus at £1,700.

Yarmouth Tramways Committee are obtaining a No. 1 "Celerity" Rail Grinder from the Equipment & Engineering Co. at a cost of £112 8s.

The British Insulated and Helsby Cables, Ltd., are to supply 1,000 66-in. copper rail bonds at a price of 3s. 7½d. each to Bradford Tramways Committee.

The English Electric Company, Ltd., has received an order from Preston Corporation Tramways Committee for covering in the fronts of the five remaining uncovered tramway cars.

The Takata Company, of Japan, has ordered another large turbine-generator for one of its new plants from the Westinghouse Electric and Manufacturing Company, of Pittsburg, Pa.

The General Electric Company, Ltd., in addition to the large order for the electrical equipment of the Brighton Railway Company, have in hand contracts for generating plant for China and India, including one for the Bombay and Baroda Railway.

Hull Corporation Tramways Committee have accepted the tender of Walter Scott, Ltd., Leeds, for 1,000 tons of steel rails at £12 per ton, plus certain additional charges in connection with Sandberg's patent sorbitic treatment. The committee decided not to consider any offers from Germany. The lowest German tender was £11 15s., with £1 per ton for special treatment.

The Bradford Tramways Committee have ordered from Cole, Marchent and Morley, Ltd., 20 tons of cast iron track brake blocks at 9s. 3d. per cwt., and 20 tons of scrap brake blocks; from Messrs. T. H. Newsome & Company, 1,000 gallons of heavy lubricating oil at 2s. per gallon; from E. Brooksbank and Company, Ltd., 2,500 gallons of machinery lubricating oil at 1s. 10d. per gallon; and from H. Summersgill, iron castings at 34s. per cwt.

BUSINESS NOTES.

The Westinghouse Electric and Manufacturing Company, of Pittsburgh, Pa., reports a marked increase in the sale of large power apparatus in 1922, and sales amounting to 1,500,000 dollars in January of turbine-generators and condensers.

The Buda Jack Service Company, of 75, Evershot Road, Stroud Green, London, N.4, have been appointed sole agents in this country for the sale and repair of Buda lifting jacks, and now have in stock a large supply of all types of jacks ranging from 5 to 75 tons.

Leo. Swain & Company, Ltd., are opening a depot in Liverpool for the convenience of their Liverpool and North Wales customers. This will carry a full stock of accessories and tyres of all makes, and there will be a garage for motor lorries, and a 16-in. diameter ram hydraulic press for tyre fitting.

The Westinghouse Electric International Company announces the removal of its office in Cuba from Edificio Banco del Canada to Edificio Banco Nacional de Cuba at Havana. Mr. John W. White is manager in charge of the Cuban office and the activities of the Westinghouse International Company in Cuba. He announces that the removal gives the staff working in that section more commodious quarters and more adequate facilities.

The Straker-Clough Trolley Bus is very effectively illustrated and described in a brochure which we have received from Clough, Smith & Co., Ltd., of 36, Victoria Street, S.W.1, who are the sole agents for this type of vehicle. This firm undertake the complete installation of trolley-bus systems, having already constructed over 25 route miles in this country. (The Straker-Clough Trolley-bus was the subject of an illustrated article in our issue of November 17 last.)

Nobel Industries, Ltd.—For some months past workmen have been engaged in reconstructing Buckingham Palace Hotel to make it suitable for the offices of Nobel Industries, Ltd. It is in the future to be known as Nobel House, Buckingham Gate, S.W.1, and the final transfer of the staff of Nobel Industries, Ltd., to the new offices has now been completed. The head office at 6, Cavendish Square, W.1, has been closed, and all business and correspondence is now being conducted from the new headquarters of the company.

POSITIONS VACANT.

OUTSIDE MANAGER FOR OMNIBUS COMPANY.

A firm of Motor Omnibus Proprietors invite applications for the appointment of an Outside Manager to take over entire charge so far as regards outside work of the Company's system of upwards of fifty Motor Omnibus Services. Only those with long previous experience of the identical work need apply. Salary £500.

Applications, accompanied by not less than copies of two testimonials, should be addressed to Box No. 24, care of THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or −	Aggregate. Wks.	1921-22.	+ or −
Aberdeen Corporation	Feb. 15	3,480	3,182	− 298	37¾	132,894	− 11,997
„ Motor Buses	„ 15	60	133	+ 73	37¾	9,031	+ 7,960
Ayr Corporation ..	„ 18	548	475	− 73	40	29,016	− 2,093
Barrow Corporation ..	„ 11	854	612	− 242	45	37,640	− 3,138
Belfast City	„ 17	11,156	11,401	+ 245	46	577,364	+ 50,845
Birkenhead Corporation	„ 19	2,573	2,469	− 104	45¾	120,639	− 13,195
„ Motor Buses	„ 19	365	519	+ 154	45¾	30,786	+ 11,679
Birmingham Corporat'n	„ 11	31,911	27,182	− 4,729	45	1,318,417	− 115,747
„ Motor Buses	„ 11	1,808	1,644	− 164	45	88,997	− 1,508
Blackburn Corporation	„ 15	2,404	2,043	− 361	46¾	110,304	− 10,308
Bradford Corporation..	„ 18	14,859	13,175	− 1,684	46	630,749	+ 9,778
Burnley Corporation ..	„ 18	3,426	2,996	− 430	..	..	..
Burton-on-Trent Corp.	„ 19	596	557	− 39	46	28,797	+ 425
Bury Corporation ..	„ 19	2,385	2,159	− 226	46¾	112,328	− 5,115
Chatham & District ..	„ 9	1,432	1,357	− 75	6	8,153	− 1,322
Chesterfield Corporat'n.	„ 13	634	559	− 75	46	26,903	− 611
„ Motor Buses	„ 13	880	683	− 197	46	34,830	− 2,369
Derby Corporation ..	„ 18	2,308	2,024	− 284	46	99,169	− 7,025
Dundee City ..	„ 15	3,150	2,932	− 218	39¾	126,276	+ 5,194
East Ham Corporation	„ 18	2,019	2,093	+ 74	46¾	97,816	+ 2,132
Edinburgh Corp. Trys.	„ 11	..	10,701	..	39	493,742	+ 4,485
„ Motor Buses	„ 11	..	3,075	..	39	138,912	..
Glasgow Corporation ..	„ 18	45,837	43,935	− 1,902	37¼	1,697,369	+ 4,002
Glossop (U.E. Sup. Co.)	„ 18	220	238	+ 18	7	1,604	− 49
Halifax Corporation ..	„ 14	4,362	3,643	− 719	44¾	196,400	+ 422
„ Motor Buses	„ 14	110	64	− 46	44¾	3,534	− 1,591
„ Railless Cars	„ 14	..	38	..	30	1,601	..
Huddersfield Corporatn.	„ 18	5,207	4,640	− 567	47	243,288	+ 8,332
Ilford U.D. Council ..	„ 18	1,328	1,388	+ 60	46	69,327	+ 9,732
Ipswich Corporation ...	„ 18	788	707	− 81	46	39,633	− 5,017
Isle of Thanet ..	„ 15	481	506	+ 25	19	12,104	+ 1,084
Kilmarnock Corporat'n	„ 18	357	318	− 39	39¾	14,317	− 440
Leicester Corporation..	„ 17	6,215	7,044	+ 829	7	49,400	+ 3,891
Liverpool Corporation	„ 18	26,208	27,644	+ 1,436	7	198,956	+ 11,861
London County Ccl. ..	„ 22	99,693	90,826	− 8,867	47	4,581,061	+ 201,102
Maidstone Corporation	„ 16	401	374	− 27	45	21,730	− 510
Manchester Corp. ..	„ 18	37,699	36,298	− 1,401	46	1,783,235	+ 183,404
Newcastle-on-T. Corp.	„ 11	11,344	10,415	− 929	45	505,418	+ 980
Nottingham Corp.	„ 16	7,452	7,311	− 141	46	314,849	− 41,126
Oldham Corporation ...	„ 19	4,690	4,314	− 376	48	225,070	+ 1,690
Preston Corporation ...	„ 15	1,842	1,715	− 127	45¾	87,371	+ 3,310
„ Motor Buses	„ 15	..	126	..	3¾	454	..
Reading Corporation ...	„ 16	1,540	1,423	− 117	46	72,647	− 3,727
„ Motor Buses	„ 16	259	280	+ 21	46	15,549	+ 3,386
Rotherham Corporation	„ 20	2,703	2,188	− 515	46	104,086	− 19,138
Salford Corporation ..	„ 19	10,551	9,935	− 616	45¾	493,544	+ 21,637
Sheffield Corporation..	„ 19	20,399	18,238	− 2,161	46¾	898,583	− 68,658
Southampton Corp. ..	„ 8	2,905	2,882	− 23	45	133,270	− 8,714
„ Motor Buses	„ 8	182	100	− 82	45	6,905	− 4,150
Southend-on-Sea Corp.	„ 15	1,589	1,773	+ 184	46	113,887	+ 7,306
South Shields Corp. ..	„ 11	1,854	1,588	− 266	46	76,934	− 10,700
St. Helens Corporation	„ 14	2,088	1,515	− 573	46	81,838	− 14,095
Sunderland Corp. ..	„ 19	2,789	2,469	− 320	46	120,351	− 20,920
Swindon Corporation..	„ 15	368	326	− 42	45¾	17,980	+ 183
Tyneside Trys., Trds...	„ 8	1,108	842	− 266	6	4,476	− 1,985
Wallasey Corp. ..	„ 18	2,553	2,353	− 200	46¾	128,544	+ 7,076
„ Motor Buses	„ 18	130	175	+ 45	46¾	10,898	+ 2,988
Walsall Corporation ..	„ 18	1,913	1,606	− 307	47	75,653	− 8,394
„ Motor Buses	„ 18	1,287	898	− 389	47	43,161	− 11,410
Walthamstow U.D.C....	„ 18	1,815	1,679	− 136	46	93,574	− 575
Warrington Corp. ..	„ 16	1,038	980	− 58	46	45,886	− 418
West Ham Corp. ..	„ 16	5,927	5,533	− 394	46	271,165	+ 2,934
Wolverhampton Corp.	„ 22	2,204	2,185	− 18	47	109,334	− 4,314
„ Motor Buses	„ 22	590	640	+ 50	47	30,695	+ 8,853

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1920-21.	1921-22.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	Feb. 18	£78,001	81,559	7	£570,927	+ 15,149
Ballarat & Ben. (4 wks.)	Dec. 4	4,601	4,762	36	40,287	+ 2,686
Brazilian Traction (Mlrs)	Dec.	12,600,000	15,405,000	52	170,867,000	+ 35,961,000
Brisbane	Jan.	46,280	48,790	4	48,790	+ 2,510
British Columbia $	Dec.	917,668	940,113	26	5,192,915	+ 175,554
Buenos Aires Lacroze ..	Jan.	61,111	61,198	30	404,817	+ 7,420
Burmah Tr. & Lght. Rs.	Jan.	50,035	59,362	5	350,747	+ 41,984
Calcutta .. Rs.	Feb. 18	* 3,288	109,538	7	723,302	+ 348,838
Cape Town	Jan.	..	30,280	..	..	..
Carthagena & Herrerias	Jan.	3,877	3,075	4	3,075	− 802
Cordoba	Dec.	19,299	22,641	39	207,992	+ 29,564
East India	Jan.	4,299	4,080	26	24,834	− 606
Kalgoorlie ..	Nov.	2,969	2,419	48	24,944	− 8,728
La Plata ..	Nov.	5,573	6,453	48	58,098	− 3,652
Madras (2 weeks) Rs.	Jan. 31	* ...	54,390	4	105,239	− 67,041
Manila .. .. $	Dec.	316,467	315,599	52	3,681,011	+ 262,605
Montevideo	Jan.	50,863	32,634	13	132,190	+ 11,454
Para	Jan.	24,231	22,966	9	45,626	− 2,858
Pernambuco	Feb. 19	4,655	3,750	7¼	26,183	− 7,918
Port Elizabeth	Jan.	..	8,120	..	..	..
Rangoon .. Rs.	Jan.	122,558	137,850	4	137,850	+ 15,292
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Jan. 7	9,969	14,882	1	14,882	− 4,913
Winnipeg .. $	Nov.	477,957	477,880	48	4,910,971	+ 156,466

* Strike of employees.

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LONDON, MARCH 4, 1922.

NEWCASTLE TRAMWAY STRIKE.

The strike of employees of Newcastle Corporation Tramways appears to be receiving as much local sympathy as it deserves, which amounts to very little indeed. After making every allowance, there seems to be no more reason why the townspeople should have been suddenly deprived of their tramway service last week-end than that the men should work four hours less each week than their colleagues in other towns. The Transport and Electricity Committee have certainly enlisted the sympathy of the inhabitants by their patient and conciliatory treatment of the men. Not only did they repeatedly meet them and lay the whole position before them, but as soon as the Committee were convinced that the wages paid in Newcastle were slightly under the average for comparable towns in the North of England—even though the Newcastle hours have been only 44 per week—they offered an adequate increase and several accompanying improvements in working conditions. Had the men accepted these terms they would be as well, or even better, situated than the tramway employees in many similar towns. It seems that the Newcastle men have placarded the city with a manifesto declaring that it is not extra pay for extra hours of work which they want, but hours of labour that will permit them "to enjoy life." But to suggest that a 48-hour week makes this impossible is futile. Their fellow-workers on tramways throughout the country have for a long time accepted the 48-hour week as a normal period of duty. Indeed, as Alderman Mayne told the City Council on Wednesday, the 44-hour week was granted in Newcastle in April, 1919—after the existing National Agreement was signed—not as a right, but as a privilege. The men have enjoyed this privilege for three years, and the time has now come when the Committee feel bound to withdraw it in order to economise the resources of the undertaking and place it on a sounder financial basis. They are also impelled by the fact that the people of Newcastle want a later car service, which cannot be afforded if overtime rates are to be paid. These facts have all been made plain to the men, and it seems inconceivable that, being ratepayers of the town themselves, they should refuse to co-operate with the tramway management. Rather, it seems, would they prefer to continue to work under the old conditions until they have so crippled the undertaking that it would no longer be capable of providing them with work at all. As was remarked in this column only a couple of weeks ago, no tramway or any other concern can offer employment on more favourable conditions than its economic position allows. We can only hope that by the time these lines appear the Newcastle men will have realised their mistake and returned to work.

L.C.C. TRAMWAY MATTERS.

THROUGH RUNNING WITH LONDON UNITED TRAMWAYS.

At the meeting of the London County Council on Tuesday, the Highways Committee reported that the Council on January 31, 1922, decided to serve on the London United Tramways notice of its intention to complete the purchase of the company's undertaking in London on May 2, 1922. Under the agreement with the company dated December 6, 1917, if the company are not required to work exclusively the lines purchased, the Council is at liberty to run over the company's lines in Middlesex jointly with the company, and the company are at liberty to run jointly with the Council over the lines purchased, the mileage being equal and each party accounting for gross receipts taken, the other terms and conditions being agreed or determined by arbitration; further, each party is to have the right to fix and alter fares on its own tramways. The Highways Committee have been in communication with the company as to the through running arrangements after the transfer of the lines, and as a result it is proposed that instead of the provisions of the agreement as to running being carried into effect at the time of transfer, those provisions shall remain in abeyance while the arrangement referred to below is in force. The Highways Committee therefore recommended that an agreement be entered into with the London United Tramways to provide that, for a period of three years and thereafter until determined by either party by six months' previous notice:—

(i) The company shall continue to operate the lines transferred to the Council in Hammersmith; (ii) the Council shall run one service from Hammersmith to the County boundary and thence along the company's lines to Kew Bridge or such other point on the company's system as may be agreed; (iii) the Council shall operate the whole of the service on the company's lines between the County boundary at Merton and Wimbledon; (iv) each party shall retain the receipts from its own cars; (v) the company shall fix the fares on the transferred Hammersmith lines subject to their not increasing the fares beyond the rates at present in force; and (vi) the Council shall fix the fares on the route from the County boundary at Merton to Wimbledon, and that the Highways Committee settle the other terms and conditions of the agreement.

In connection with the taking over by the Council of the portion of the London United Tramways in London it will be necessary, in order to provide the proposed through services to Wimbledon *via* Merton, for a change-over point to be installed in the tracks at the present Merton terminus, for the overhead poles and wires to be extended, and for a physical connection of the tracks to be made. The works will be carried out under the provisions of section 12 of the London County Council (Tramways and Improvements) Act, 1901, and the Wandsworth Metropolitan Borough Council has been asked to consent to the proposal, as required by the Act. The cost of the work is estimated at £1,550. The company will meet half the interest and sinking fund charges.

POWER STATION AND REPAIR DEPOT—NEW PLANT.

The Highways Committee have considered tenders for the supply and erection of three water tube boilers, superheaters, economisers, etc., in connection with the extension of the plant at Greenwich power station. They have accepted the tender of Clayton and Shuttleworth, Ltd., Lincoln, amounting to £61,392, for the supply and erection of the boilers, etc., with multiple retort stokers.

The tender of Alldays & Onions, Ltd., for the supply of foundry plant for the central repair depot, at £1,017, has been accepted by the Highways Committee.

The Highways Committee reported the result of negotiations by which part of Aspen House, Brixton Hill, is to be acquired from the Education Committee for the erection of a trailer car shed. They recommended approval of the estimates submitted by the Finance Committee for £3,000 and £41,900, representing respectively cost of part of the site and erection and equipment of the shed.

TRACK RAILS AND FASTENINGS.

Nine tenders had been received for the supply of 2,600 tons of track rails and fastenings during a period of six months, and alternatively for the supply of 4,700 tons during 12 months.

The three lowest tenders were for rails manufactured on the Continent, and after careful consideration the Highways Committee decided, subject to negotiations with the company regarding the quantity of rails that may be required, to accept the tender submitted by Walter Scott, Ltd., of Leeds. This firm's quotation was for 2,600 tons, £28,667; for 4,700 tons, £50,307 5s.

VOTES OF THANKS.

The Highways Committee have passed a hearty vote of thanks to the chairman, Mr. W. J. Squires, J.P., for his services on the committee during the period he has been a member of the Council,

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and to the vice-chairman, Lt.-Colonel A. C. H. Kennard, for his services during the past year.

COMMENTS ON DISTRICT AUDITOR'S OBSERVATIONS.

The Finance Committee, commenting on the report by the district auditor on the accounts of the Council for the year ended March 31, 1920, which had been referred to the various committees concerned, stated in regard to the tramways :—

Deficiency.—A deficiency of £18,000 in the tramways account was carried to the accounts for the year 1920-21, having regard to counsel's opinion that the Council had no power to raise in the rates levied in the year moneys to meet an estimated future deficiency on tramways account. The district auditor, supported by the Minister of Health, maintained that the deficiency should have been transferred forthwith to the special county account. To meet these views, the Finance Committee have agreed to such a course being adopted, but they remain of opinion that their former practice was, from the point of view of accountancy, correct.

Chargeability of Renewals.—The auditor stated that "the only justification for charging a portion of renewals to capital account would appear to be the existing serious financial position of the undertaking, and the desire to prevent a charge being made on the special county rate." While it is true that it was the financial position of the undertaking which rendered it essential to examine the question of charges upon the undertaking, there are very material arguments in favour of charging to capital account a proportion of the cost of renewal of tramway track, particulars of which were fully reported to the Council on March 9 and 10, 1920.

All tramway reports were adopted.

THE COUNCIL AND THE UNDERGROUND GROUP.

Mr. Gordon asked (i) whether the attention of the Highways Committee had been called to a statement by Lord Ashfield at the meeting of the Metropolitan District Railway on February 23 to the effect that he had been invited by the Government to make new proposals to the committee which was set up under the Trade Facilities Act last year and that he had availed himself of the invitation and that negotiations were proceeding ; (ii) whether any similar request had been addressed to the Council ; (iii) whether the chairman would write to the Government immediately asking that the Council, being the central governing authority for the Metropolis, should have an opportunity of considering such schemes as might be submitted.

Mr. Squires replied : (i) Yes ; (ii) No ; (iii) the statement of Lord Ashfield was made after the last meeting of the Highways Committee. The question of the advisability of sending a communication to H.M. Government is, however, receiving careful consideration.

In further reply to Mr. Gordon, Mr. Squires said : I have observed the reports in the press as to the chairman's statement at the annual meetings of the Underground Railway Companies and the London General Omnibus Co., and have noted that there has been a loss of 6 per cent. in traffic during 1921 as compared with 1920 ; the decline in the number of passengers carried on the Council's tramways to date is 3½ per cent., but this decline has now been arrested, and the figures published to-day show an increase of over one million passengers for the two weeks ended February 15 as compared with the corresponding period of last year.

NEWCASTLE TRAMWAY STRIKE.

EMPLOYEES REFUSE TO ACCEPT 48-HOUR WEEK.

The employees of Newcastle-upon-Tyne Corporation tramways decided on Sunday last to cease work rather than consent to the Transport and Electricity Committee's decision to increase the working week from 44 to 48 hours, and the city has since been without its tramway service. The Corporation omnibus drivers and conductors are also on strike. It will be remembered that following the decision of the City Council in December last to rescind a former resolution restricting the hours of municipal employees to 44 per week, the Transport and Electricity Committee on January 26 resolved to bring the tramway working hours into line with those fixed under the National Agreement. The employees strongly resented this, and have been in negotiation with the committee in the hope either of persuading them to nullify the increase or to grant a proportionate advance of pay. The committee, however (as noted in our issue of last week), at first declined to accept the men's proposals and reminded them that the increase in working hours was necessitated by the financial position of the undertaking. Not only would it mean a considerable reduction in expenditure, chiefly by obviating overtime, but would make possible a later car service. Negotiations were resumed on Saturday morning last between the sub-committee of the Transport Committee and the men's representatives, and were continued without avail until 5.15 a.m. on Sunday. The sub-committee afterwards issued a statement in which they remarked that, during the negotiations, representatives of the men asserted that the conditions asked for were equal to 8s. per week. This contention was not accepted by the committee who, while maintaining their claim that the 48 hours' week should be worked in harmony with other tramway undertakings, recognised that the amount of wages now earned by motormen and conductors was slightly less than wages paid in other comparable towns, and offered to give an additional 1s. 6d. per week, exclusive of merit pay, which would have corrected this deficiency. Other advantages and improvements in conditions of working were in the course of negotiations amicably arranged for submission to the men. In accordance with a resolution of the Council, the increase of the working hours would not have involved any dismissals. "In view of the proposals agreed to by both parties for submission to the men having been rejected," the statement concluded, "these are now withdrawn. The depots will be open to-morrow (Monday) morning as usual for any men who care to report for duty, but the present rates of pay will operate for a 48 hours week."

In an editorial comment on the strike the *Newcastle Daily Journal* says : "If anything has really astonished and gratified the public it is the firm stand taken by the Tramway Sub-Committee. The members explained the exact position of the tramway undertaking, granted reasonable concessions here and there, and then intimated quite clearly that the limit had been reached. In this undoubtedly they will have the support of the public."

ALDERMAN MAYNE'S STATEMENT.

Alderman R. Mayne (chairman of the Transport and Electricity Committee), addressing the City Council on Wednesday, said the Committee had taken no steps to organise a service because they hoped that the men, after reflection, would realise they had made a mistake in refusing to accept an offer which, taken as a whole, was an improvement on the provisions of the National Agreement. "I deliberately assert," he added, "that the proposed settlement would have put Newcastle tramwaymen on terms and conditions equal to or above the average of Leeds, Manchester, Salford, Birmingham, Halifax, Cardiff, Nottingham, Hull and Sunderland."

MISCELLANEOUS NEWS AND NOTES.

Penny Fares at Portsmouth.—The Corporation Tramways Committee have resolved to reinstate 1d. fares on the tramways.

Repair of Chester Tramway Track.—The City Tramways Committee have recommended that £12,000 be spent on track repairs.

Penny Fares at Burton.—Short penny stages will be introduced on Burton-on-Trent Corporation Tramways on April 1 for an experimental period of three months.

Blackpool Tramway Track Reconstruction.—The Electricity and Tramways Committee have decided to relay the track from Talbot Square to Wellington Road at an estimated cost of £16,000.

Improved Coal Output.—The output of coal for the week ended February 18 was 5,000,800 tons, compared with 4,912,500 tons in the previous week and 4,284,100 tons in the corresponding week of 1921.

Scottish Motorists and Princes Street.—The National Council of the Scottish Commercial Motor Users' Association have unanimously resolved to oppose the granting of permission for central tramway poles to be placed in Princes Street, Edinburgh.

Revision of March, 1919 Agreement.—A special meeting of the National Joint Industrial Council for the tramways industry was held in London yesterday (Friday) to receive the report of the committee which has been considering the revision of the March, 1919, Agreement. At the time of going to press no official report of the proceedings was available.

Manchester Motorman's Devotion to Duty.—A Manchester tramcar driver, Harry Ashworth, received an injury to his stomach by being flung against the controller when his car collided with a lorry. He remained at his post, and after a short delay drove the car to the depot. He arrived there in great pain and was removed to hospital, where it was found he had sustained internal injuries.

"Keep to the Left" at Hull.—It was reported at Hull Tramways Committee that the Executive Council of the Municipal Tramways Association had approved a suggestion of the Advisory Committee appointed by the Ministry of Transport that footpath traffic and vehicular traffic should conform to the same rule—"keep to the left." The Tramways Committee concurred, and will seek the co-operation of the Watch Committee.

Sunderland Tramway Strike.—The strike of the employees of Sunderland District Electric Tramways, Ltd., which commenced on February 2, has been continued. Mr. G. Stratton, the resident manager, stated that the company had decided, in view of the threat of the miners to withhold their patronage, not to run the cars with a new staff. Should the miners carry out their threat, the system would have to be run at a loss, and the company do not feel inclined to do that.

Vehicle Builders' Strike.—Over 10,000 members of the Amalgamated Society of Railway Vehicle Builders, Wheelwrights, Carpenters, and Mechanics, the headquarters of which are at Wigan, are on strike against the wage reductions proposed by the employers. Railway vehicle builders and kindred workers all over the country are affected by the strike.

Pre-War Fares at Bolton.—The Corporation Tramways Committee have decided that from Monday to Friday between the hours of 12 noon and 2 p.m. the ordinary pre-war fares shall be re-established. This has been confirmed by the Town Council. The same privilege had formerly been granted up to 9 a.m. and between the hours of 5 and 6.30 p.m., so that the pre-war fares from April 3 next will be as follows :—Monday to Friday, up to 9 a.m., 12 noon to 2 p.m., and 5 p.m. to 6.30 p.m. ; Saturday up to 9 a.m., and from 12 noon to 1.30 p.m. At all other times and on Saturday afternoons and Sundays, ½d. extra will be added to the fares on each route. The fares for children, however, have never been increased and are still at pre-war level. Bolton was one of the last undertakings in the country to make any alteration in fares, the first revision being made in April, 1921.

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Engineering and Shipbuilding Crisis.—At the time of going to press, no settlement had been reached in the grave disputes which have arisen in the engineering and shipbuilding industries. In the engineering trade, the employers' lock-out notices by which they intend to assert their right to "freedom of management," terminate on March 11. The abolition of the bonus in the shipbuilding industry is to commence on March 15. The men's representatives state that this will involve a stoppage. One million men are affected.

Electricity Supply Bill.—In the House of Lords on Thursday, Viscount Peel moved the second reading of the Electricity Supply Bill, which was, he said, an amending Bill to give full effect to the Electricity Supply Act passed two years ago. A measure containing many of the provisions of the present Bill was introduced into the House of Commons, but owing to the opposition, the Bill was withdrawn. The controversial clauses had been cut out from the present Bill. It was agreed to postpone the second reading and the debate was adjourned.

Keighley Corporation.—Mr. J. A. Bromley, manager of Keighley Corporation tramways, estimates a loss for the year ending March 31 of £6,000, which will be mainly due to the greatly increased cost of track maintenance. He urges that tramway authorities should be relieved of the unfair burden of maintaining road surfaces, and that tramcars should be licensed on their seating capacity as in the case of motor coaches, and contends that the upkeep of the road beyond the actual rails on which the cars run should be left to the County Councils, which would receive grants from the Road Board.

London Underground "Efficiency" Meetings.—A highly interesting and instructive paper on "Some facts about the construction of the London tube railways" was delivered on Monday evening at one of the Efficiency Meetings which the London Underground Railways and the L. G. O. C. organise for the benefit of their employees. The lecture was delivered by Mr. Harley H. Dalrymple Hay, M.Inst.C.E., consulting engineer to the London Electric Railway, who directed much of the constructional work of the London underground system. Mr. H. E. Blain, C.B.E. (assistant managing director of the Underground Group) presided. Tea was served before the lecture and the whole proceedings proved very enjoyable.

A Ministry of Communications?—In the House of Commons on Wednesday Sir R. Horne (Chancellor of the Exchequer) said the Geddes Committee recommended that the Ministry of Transport should be transferred to the Board of Trade. That might ultimately be the right thing to do, but there were many things which the Ministry of Transport had still got to wind up, and many things which could by statute only be done by the Ministry. It would be better to take some time to consider the whole matter in connection with an impending large reorganisation of Government Departments. There would be much to be said for uniting the Ministry of Transport with the Post Office, and having a Ministry of Communications.

Llandudno and Colwyn Bay Tramway Strike.—The employees of the Llandudno and Colwyn Bay Electric Railway Company went out on strike on Saturday, February 18, as a protest against the proposal of the company to make a reduction of 1s. per week in their wages in addition to the automatic decrease under the national sliding scale. Mr. Alex. G. Balfour (general manager of the company) states that he placed the proposed reduction before the men at a meeting on Wednesday, February 15, when it was accepted by them. He understood that the men afterwards received some communication which seemed to have unsettled them, and the strike, without notice, was decided upon on the following Friday night. The men having left their work without notice, they had all been discharged from the company's service. Mr. Balfour points out that the wages and bonus of the employees had always been on a lower scale than those of the larger tramway undertakings, as the traffic is, in the main, of a seasonal nature. Mr. Balfour denies that there was any breach of an award on his part. Motor omnibuses have done good business in the absence of the tramcars.

Edinburgh Tramways Electrification.—The Tramways Committee have recommended that application be made to Parliament for powers to construct a tramway along George Street, connecting St. Andrew Square with the West End of the city, a route which would be parallel with Princes Street. The committee's decision is not a recommendation to proceed with the actual work of construction, but merely that a proposed clause should remain in the Provisional Order which is being promoted by the Corporation. The insertion of this clause is a precautionary measure that would avoid delay should the Town Council desire to proceed with the scheme. It was decided to delay consideration of Mr. Pilcher's report on the proposed electrification of the Northern routes until the committee had had an opportunity of receiving a deputation of the citizens resident in these districts who are desirous of the immediate electrification of the routes. Mr. Pilcher regards the electrification as too costly to be proceeded with immediately, and suggests that those routes should follow the electrification of the Portobello route. It was agreed to recommend an extension of the electric tramways from Nether Liberton to Liberton Dams, and a proposal to connect Portobello with the Leith system via Seafield Road was remitted to the manager for report.

North Metropolitan Electric Power Supply Co.—The issue of £250,000 8 per cent. cumulative second preference stock was subscribed for over 13 times by more than 3,000 applicants.

PERSONAL.

Mr. H. H. Gordon, who for many years has been a member of the Highways Committee of the London County Council, and has taken particular interest in tramway matters, did not stand at the triennial election of the Council on Thursday.

Mr. James Makin, chief electrical engineer to the Bexley Urban District Council, and engineer and general manager of the Bexley Tramways and Dartford Light Railways joint undertaking, has been appointed chief electrical engineer to the city of Hereford.

Alderman E. H. Sellers, J.P., who for nearly seven years has been chairman of the Huddersfield Corporation Tramways Committee, died on Wednesday after a short illness. Alderman Sellers, who was 68 years of age, entered the Town Council in 1907, and was appointed to the Tramways Committee in 1908. In 1915 he was elected deputy chairman of the committee and a few months later was appointed chairman. He took the deepest interest in all matters connected with the tramways department. His magnetic personality made him highly esteemed by every member of the staff, and the department owes much to his unfailing diplomacy and shrewdness. Alderman Sellers was a member of the Executive Council of the Municipal Tramways Association and devoted much of his time to national tramway problems.

FINANCIAL.

London Suburban Traction Group.—The receipts for the week ended February 25 were £47,421 (previous week £45,430). The aggregate from January 1 to date amounts to £357,698.

London Underground Group Receipts.—The receipts of the Common Fund Companies for the week ended February 25 amounted to £214,665 (previous week £208,250). The aggregate from January 1 to date amounts to £1,649,569.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended March 1 amounted to £96,437, a decrease of £4,430 compared with the corresponding period of last year. The route length was 155·91 miles, as compared with 152·26 a year ago. From April 1 (the commencement of the financial year) to March 1 (48 weeks) the total receipts were £4,677,496, an increase of £196,569 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended February 18 give total receipts of £348,299, or £25,277 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £178 15s. 11d. per mile of single track, and last year at the rate of £191 15s. 5d., thus showing a decrease for the week of £12 19s. 6d. per mile open.

London United Tramways.—Sir William M. Acworth, presiding at the annual meeting of the London United tramways, said there had been a great improvement in the results of the year's working. There was a surplus of £59,474, which would go to the reduction of the deficiency of £70,000 for the previous year. The South Metropolitan tramways declared a dividend of 7½ per cent. on the ordinary shares; and the Metropolitan Electric tramways a dividend of the balance of 4½ per cent. in respect of the year ended December 31, 1919, and 2½ per cent. for December 31, 1920.

Wallasey's Happy Position.—Wallasey Corporation tramways (the general manager of which is Mr. R. R. Greene) are able to relieve the rates to the extent of £8,500, in spite of the fact that since April, 1921, there has been a decrease of 3,023,137 in the number of passengers. A surplus of £18,000 had been anticipated, but owing to the heavy slump in traffic this was not realised. An increase in the price of fares, however, helped to right matters, and Wallasey was one of the five undertakings which last year paid their way. The omnibuses made a profit of £860, though a loss of £545 had been estimated. Penny fares were recently restored on the tramways.

Fife Tramway, Light and Power Co., Ltd.—The annual meeting was held in Edinburgh, on February 24, Mr. William Low (the chairman) presiding. As in the case of the Power Company, he said, the receipts of the tramway undertakings had been affected by the coal strike and trade depression. Since the close of the accounts, an issue of £250,000 7 per cent. debenture stock was made, which would enable the company to repay outstanding loans, and for the first time for some years have cash available for development purposes. The gross revenue from the company's properties amounted to £78,394, compared with £72,801 for the year 1920. The balance available after deducting debenture and loan interest, fees, etc., transfer of £17,000 to reserve, and allowing for the amount brought forward, was £41,037, out of which the full dividend on the preference shares for the year had been paid, leaving an undistributed balance of £30,117. After payment of a dividend on the ordinary shares at the rate of 8 per cent. £4,357 would be carried forward.

Paisley District Tramways Co.—The annual meeting was held on February 22, Mr. Owen H. Smith presiding. The chairman said the traffic had increased in spite of the trade depression, but the expenditure had also increased. The general result was a profit of £34,736. After providing for general interest, income tax, interest and sinking fund on debentures, the usual appropriation to general reserve, and providing the 5 per cent. dividend and sinking fund on the preference shares, they were able to recommend a dividend of 4 per cent. on the ordinary shares, and increase the amount carried forward from £6,545 to £8,032. The amount added

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to general reserve for the year was £12,139, to the sinking funds £5,754, and to the carry forward £1,487—in all £19,380—a very satisfactory total. The Chairman referred to the suggested purchase of the undertaking by Glasgow Corporation, and replied to various criticisms which had been made of the company's system in the discussions on the matter. "Should they decide to offer us a price that we consider fair and reasonable" he remarked, "we shall hope to complete an agreement for sale. Should the negotiations not come to anything, no harm will have been done."

BUSINESS NOTES.

Messrs. Laffly (England) Co., late of Addison Avenue, London, W., have changed their address to Lonsdale Road, Queen's Park, N.W. Their new premises are much more commodious, and will enable them to hold a stock of the well-known "Laffly" municipal machines including road sweepers, road rollers, tipping wagons and their new type street watering wagon, as well as to carry out repairs.

Samuel Cook & Company, of Albert Works, Bury, announce a change in the proprietorship of the firm. The business has been acquired by Mr. Leslie H. Lomas, B.Sc. (Eng.), F.R.S. (late of Messrs. De Bergue and Company, Ltd., Strangeways Iron Works, Manchester), who is an engineer of wide experience. The business will be carried on as hitherto under the name of Samuel Cook and Company. The firm intend to maintain the same high standard of workmanship and quality of output as in the past.

Messrs. Gabriel & Company, of Birmingham, are supplying the fittings for the twelve new double-deck railless cars which are being constructed for the Birmingham Corporation by Railless, Ltd. The cars are being fitted throughout with Gabriel and Company's "Clarus" aluminium alloy. In building railless cars, weight is a great factor, and this metal has been found of advantage as it is very strong and only one-third the weight of iron or brass. The Birmingham tramways department hope to begin their railless service in May.

CONTRACTS

Burnley Tramways Committee have recommended acceptance of the following tenders:—Walter Scott, Ltd., Leeds, 200 tons of Titanium-treated steel rails, at £12 5s. per ton; Thermit, Ltd., London, welding of 400 joints on terms mentioned in their tender.

Leeds Corporation Tramways Committee have accepted the following tenders:—One mile of circular trolley wire, Tramway Supplies, Ltd.; 45 h.p. motor for the Kirkstall Road depot, J. W. Hinchliffe; ten partial electrical equipments for tramway cars, the English Electric Co., Ltd.

Straker-Squire, Ltd., of Edmonton, London, N., have just received a repeat order from the Leigh Corporation for six single-deck omnibuses of the "A" type, the bodies to have front and rear entrances. This Corporation are already running six Straker-Squire omnibuses in Lancashire.

Ayr Town Council have accepted the following tenders for laying a double tramway track in Prestwick Road and five passing places: Alexander Stark & Sons, Ltd., at £12,201; Hadfields, Ltd., for about 1,350 tie bars at 2s. 10d. each; Thermit, Ltd., to do the Thermit welding required at 30s. per joint (probably 240 joints) plus wages of the welder at £4 10s. per week.

Halifax Tramways Committee have accepted tenders as follows:—Alexander McBean & Son, Wolverhampton, for 100 tons of rails, at £12 14s. per ton, and 4 tons of fish plates at £16 10s. per ton; Metropolitan-Vickers Electrical Co., Manchester, for two spare armatures, at £95 each; the English Electric Co., Ltd., for the supply of three controllers at £55 each. The committee have referred tenders for a single-deck omnibus to a sub-committee, with power to act.

Bolton Tramways Committee received a report from the general manager (Mr. J. Barnard) recommending that new equipment be fitted to the cars which are at present furnished with 33 N.D.K. equipments. He submitted a quotation from the English Electric Co. for 8 new car equipments, comprising 16 motors, 16 controllers, 8 circuit breakers and 8 magnetic brakes. The committee decided that a firm offer of a sum named be made to the company for the new equipment.

METAL PRICES.*

		Price on March 2.	Price on February 23.
COPPER.			
Best Selected	per ton	£61	£61
Electro Wirebars	per ton	£65 10s.	£65 10s.
H.C. Wire, basis	per lb.	10d.	10d.
Sheet	per lb.	9 13/16d.	9 13/16d.
PHOSPHOR BRONZE WIRE (Telephone).			
Phosphor Bronze Wire, basis ...	per lb.	1s. 2d.	1s. 2d.
BRASS 60/40.			
Rod, basis	per lb.	7¼d.	7¼d.
Sheet "	per lb.	9¾d.	9¾d.
Wire "	per lb.	10¼d.	10¼d.
PIG IRON.			
Cleveland Warrants	per ton	£4 15s.	£4 15s
Galvanised Steel Wire, basis 8 S.W.G.	per ton	£19	£22
LEAD PIG.			
English	per ton	£21 15s.	£21
Foreign or Colonial	per ton	£20 12s. 6d.	£19 12s. 6d.
TIN.			
Ingot	per ton	£141 5s.	£140 7s. 6d.
Wire, basis	per lb.	1s. 11½d.	1s. 11½d.

* Supplied by the British Insulated and Helsby Cables, Ltd.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	Feb. 22	3,382	3,289	— 93	38¾	136,183	— 12,091
" Motor Buses	" 22	57	131	+ 74	38¾	9,162	+ 8,034
Ayr Corporation ..	" 25	538	477	— 61	41	29,494	— 2,154
Barrow Corporation ..	" 25	847	651	— 196	47	38,898	— 3,591
Belfast City	" 24	11,168	11,580	+ 412	47	588,944	+ 51,257
Birkenhead Corporation	" 26	2,593	2.562	— 31	46¾	123,202	— 13,225
" Motor Buses	" 26	384	532	+ 148	46¾	31,318	+ 11,826
Birmingham Corporat'n	" 18	32,381	27,806	— 4,575	46	1,346,223	— 120,322
" Motor Buses	" 18	1,870	1,683	— 187	46	90.681	— 1,695
Blackburn Corporation	" 22	2,465	2,202	— 263	47¾	112,506	— 10,532
Bradford Corporation..	" 25	13,644	13,878	+ 234	47	644,627	+ 10,012
Burnley Corporation ..	" 25	3,498	3,304	— 194	..	..	..
Burton-on-Trent Corp.	" 26	605	597	— 8	47	29,395	+ 417
Bury Corporation ..	" 26	2,531	2.288	— 243	47¾	114,616	— 5,358
Chatham & District ..	" 16	1,511	1,466	— 45	7	9,619	— 1,367
Chesterfield Corporat'n	" 20	618	556	— 62	47	27,457	— 673
" Motor Buses	" 20	860	690	— 170	47	35,520	— 2,539
Derby Corporation ..	" 25	2,391	2,078	— 313	47	101,248	— 7,338
Dundee City ..	" 22	3,063	2,889	— 174	40¾	129,165	+ 5,019
East Ham Corporation	" 25	2,140	2,134	— 6	47¾	99,950	+ 2,126
Edinburgh Corp. Trys.	" 18	..	10,888	..	40	504,630	+ 3,743
" Motor Buses	" 18	..	3,154	..	40	142,066	..
Glasgow Corporation ..	" 25	45,167	43,480	— 1,687	38¾	1,740,850	+ 2,450
Glossop (U.E. Sup. Co.)	" 25	224	229	+ 5	8	1,833	— 44
Halifax Corporation ..	" 21	4,215	3,709	— 506	45¾	200,109	— 85
" Motor Buses	" 21	106	61	— 45	45¾	3,595	— 1,637
" Railless Cars	" 21	..	43	..	31	1,644	..
Huddersfield Corporatn.	" 25	5,264	5,083	— 181	48	248,370	+ 8,150
Ilford U.D. Council ..	" 25	1,397	1,452	+ 55	47	70,779	+ 9,792
Ipswich Corporation ...	" 25	820	726	— 94	47	40,361	— 5,096
Isle of Thanet ..	" 22	539	520	— 19	20	12,625	+ 1,066
Kilmarnock Corporat'n	" 25	376	330	— 46	40¾	14,647	— 486
Leicester Corporation..	" 25	6,346	7,211	+ 865	8	56.612	+ 4.771
Liverpool Corporation	" 25	29,084	28,983	— 101	8	227,938	+ 11.759
London County Ccl. ..	Mar. 1	100,869	96,437	— 4,430	48	4,077,496	+ 196,569
Maidstone Corporation	Feb. 23	413	372	— 41	46	22,103	— 551
Manchester Corp. ..	" 25	38,758	37,507	— 1,251	47	1,820,742	+ 182.461
Newcastle-on-T. Corp.	" 12	11,234	10,426	— 808	46	515,844	+ 5,023
Nottingham Corp.	" 23	7,321	7,432	+ 111	47	322,281	— 41,016
Oldham Corporation ...	" 26	4,754	4,481	— 273	49	229,551	+ 2,417
Preston Corporation ...	" 22	1,803	1,722	— 81	46¾	89,093	+ 3,229
" Motor Buses	" 22	..	133	..	4¾	587	..
Reading Corporation ...	" 23	1,496	1,478	— 18	47	74,125	— 3,745
" Motor Buses	" 23	259	300	+ 41	47	15,849	+ 3,424
Rotherham Corporation	" 27	2,707	2,210	— 497	47	106,296	— 19,635
Salford Corporation ..	" 26	11,353	10,838	— 515	46¾	504,282	+ 21,003
Sheffield Corporation..	" 26	20,318	18,499	— 1,819	47¾	917,083	— 70.478
Southampton Corp. ..	" 22	2,977	2,783	— 194	47	138.842	— 9,043
" Motor Buses	" 22	189	94	— 95	47	7,092	— 4.335
Southend-on-Sea Corp.	" 22	1,691	1,814	+ 123	47	115,702	+ 7,430
South Shields Corp. ..	" 11	1,854	1,588	— 266	46	76,934	— 10,700
St. Helens Corporation	" 21	2,032	1,582	— 450	47	83,420	— 14,545
Sunderland Corp. ..	" 26	2,816	2,524	— 292	47	122,876	— 21,211
Swindon Corporation..	" 22	355	316	— 39	46¾	18,296	+ 144
Tyneside Trys., Trds...	" 15	1,181	865	— 316	7	5,341	— 2,301
Wallasey Corp. ..	" 25	2,560	2,499	— 61	47¾	131,043	+ 7,014
" Motor Buses	" 25	133	217	+ 84	47¾	11,115	+ 3,064
Walsall Corporation ..	" 25	1,904	1,680	— 224	48	77,333	— 8.618
" Motor Buses	" 25	1,257	958	— 299	48	44,119	— 11,808
Walthamstow U.D.C....	" 25	1,926	1,722	— 204	47	95,296	— 744
Warrington Corp. ..	" 24	1,026	1,003	— 23	47	46,889	— 441
West Ham Corp. ..	" 23	6,080	5,625	— 455	47	276,790	+ 2,479
Wolverhampton Corp.	Mar. 1	2,240	2,290	+ 50	48	111,624	— 4,263
" Motor Buses	" 1	629	664	+ 35	48	31,359	+ 8.887

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.		Week or M'th.	LATEST RETURN. 1920-21.	1921-22.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..		Feb. 25	£78,802	84,461	8	£655.388	+ 20,808
Ballarat & Ben. (4 wks.)		Dec. 4	4.601	4,762	36	40,287	+ 2,686
Brazilian Traction (Mrs)		Dec.	12,600,000	15,405,000	52	170,867,000	+ 35,961,000
Brisbane ..		Jan.	46,280	48,790	4	48,790	+ 2.510
British Columbia	$	Dec.	917,608	940,113	26	5,192,915	+ 175,554
Buenos Aires Lacroze ..		Jan.	61,111	61,198	30	404,817	+ 7,420
Burmah Tr. & Lght.	Rs.	Jan.	50,035	59,362	5	350,747	+ 41,984
Calcutta ..	Rs.	Feb. 25	* 25,334	110,402	8	833,704	+ 433,906
Cape Town		Jan.	..	30,289	..	..	..
Carthagena & Herrerias		Feb.	2,839	2,773	8	5,848	— 868
Cordoba		Dec.	19,299	22,641	39	207,992	+ 29,564
East India		Jan.	4,299	4,080	26	24,834	— 606
Kalgoorlie ..		Nov.	2,969	2,419	48	24,944	— 8,728
La Plata ..		Nov.	5 573	6,453	48	58,098	— 3,652
Madras (2 weeks)	Rs	Feb. 28	* 0,511	39,503	8	193,602	+ 145,893
Manila	$	Jan.	321,449	309,252	4	309,252	— 12,197
Montevideo		Jan.	50,863	32,634	13	132,190	+ 11,454
Para		Jan.	24,231	22,966	9	45,626	— 2.858
Pernambuco		Feb. 26	4,458	4,017	8¼	30,201	— 8,359
Port Elizabeth		Jan.	..	8,120	..	..	..
Rangoon ..	Rs.	Jan.	122,558	137,850	4	137,850	+ 15,292
Shanghai ..	$	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore ..	$	Jan. 7	9,960	14,882	1	14,882	— 4,913
Winnipeg ..	$	Nov.	477,957	477,880	48	4.910,971	+ 156.466

* Strike of employees.

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LONDON, MARCH 11, 1922.

THE NEW TRAMWAY AGREEMENT.

The adjourned meeting of the Joint Industrial Council for the tramways industry was held at the Ministry of Labour on Thursday. At the previous meeting on March 3 the proposals that had been formulated by the employers were considered at length, and an agreement was reached on several points, but a number of questions had to be determined when the Council re-met on Thursday, March 9. From 10 o'clock until 3 p.m. the Council sat without a break before going to luncheon, which was perhaps responsible for the fact that they were able to reach unanimity on all points. The proceedings were private, but in a subsequent interview with Mr. J. Beckett, the General Secretary of the Municipal Tramways Association, we obtained the following statement :—The chief features of the agreement, which will be published next week, are as follows :

"With regard to hours of work, the average duty schedule will henceforth be 48 hours per week of six days. No schedule of weekly duty will be less than 44 hours nor more than 52. The average of these two figures is 48, but between these two limits the employers felt it would be possible to formulate schedules that would meet the varying conditions throughout the country."

With regard to the vexed question of spreadovers, it was agreed that each authority should deal with this matter in conference with the local representatives of the trade union.

The claim for a guaranteed 48-hour week was a subject of compromise. It was this question that occupied most of the time of the previous meeting. The compromise is expressed in the following terms :—

"All employees entitled at this date to a guaranteed 48-hour week shall retain such guarantee provided that the employee has presented himself for work at the appointed time on each day."

Concerning another matter that has been a bone of contention since the 1919—that is to say the temporary suspension of the tramway service, or a reduced service owing to adverse local industrial conditions—agreement was reached. This has been set out in the following terms :

"That in the event of a stoppage of the tramway service, whether complete or partial, from causes beyond the control of the tramway authorities, such as stoppages due to disputes, serious breakdown of machinery, or short time in local industry, the guaranteed week shall be suspended, and only the actual time worked shall be paid for."

A further clause relates to partial stoppage, and is in these terms :—

"In the event of a partial stoppage the tramway authority shall consult the local representatives of the union with a view to enabling the work to be divided equitably among the employees."

This clause provides machinery for determining a question around which much local trouble has surged during the last three years.

With regard to new entrants and the question of flexibility which the employers have insisted upon, some mobility has been imported into the agreement, and it is expressed in these terms :—

"The total number of new entrants into the service who are not to receive a guaranteed week of 48 hours shall in no case exceed a maximum of 10 per cent. of the total number employed ; and these shall be guaranteed a week of not less than 32 hours, to be completed within six days."

Throughout the agreement reached on Thursday there are references to conferences between the employers and local representatives of trade unions, and in this matter the agreement provides, by way of a note, although it is no part of the agreement, that the percentage of the men required within the limits of the 10 per cent. shall be, in the first instance, the subject of local negotiation, it being understood that, failing agreement, the determination shall rest with the management.

A further question which occupied the Council at very great length was the amount of time to be allowed to a spare man who may be called for duty and for whom no duty is available. This is to be governed by the following clause :—

"In the event of a man being called out he shall be paid a minimum of four hours for the first call and two hours for each succeeding call in the day."

With regard to holidays the period fixed is eight days annually, with pay, after twelve months' continuous service. The question of Christmas Day service was dealt with, and the following is the agreed clause on this question :—

"Christmas Day shall be worked when required, and double ordinary week-day rates shall be paid for the time actually worked, with a minimum of four hours' work."

A long discussion took place at the last meeting on the question of overtime rates, and the scheme of the agreement of March, 1919, was incorporated in the new agreement. That is to say, the rates will be :—Time and a quarter for the first two hours overtime, and time and a half rates for all time worked after the first two hours.

The grievance that has emerged relating to the 1919 agreement as it affects smaller authorities has been met by, first of all, the 10 per cent. margin before referred to, and by making several clauses of the agreement subject to modification by local consent. The new arrangement provides that such clauses "may be modified by agreement between the management and the trade union representatives in the case of small undertakings, or undertakings where the traffic, owing to seasonal or other causes, is of a special character."

The modifications may be effected as respects the national holidays, Christmas Day, and the rates of pay for services operated on that day, and the rates of pay for Sunday time ; also with regard to overtime rates to an employee working in excess of his schedule duty and an employee working voluntarily at the request of the management on his rest day.

The new agreement excludes from its provisions permanent-way employees and employees whose wages, overtime

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rates, and conditions of service may be regulated by those of other industries, but the Council undertook to formulate terms of a new agreement in respect of permanent way employees whose conditions of service are governed by the previous agreement, and meanwhile, so far as those men are concerned, the old agreement remains in force until May 1 next.

A considerable discussion has taken place upon the question of the elimination of privileges, emoluments, and special advantages granted to the men by individual authorities which were secured to them under the notorious Clause 10 of the agreement of 1919. After protracted discussion the following clause in the agreement was arrived at :—

> "Any privileges or emoluments or conditions of service enjoyed under Clause 10 of the agreement of March, 1919, may be discontinued six months after this agreement comes into force, provided that the employees have not come to a local agreement nor satisfied a committee of the National Council that they are entitled to the continuance of such privileges or emoluments or conditions of service ; and failing agreement by such committee, an independent person shall be appointed with power to modify or decide. The employers shall give reasonable notice to their employees of the privilege or emoluments or conditions of service which they desire to discontinue."

This is a new feature in Whitleyism, for it distinctly provides, and even anticipates in a measure, that it will be impossible to reach an agreement, and imports the old machinery of arbitration, for in effect the independent chairman will be the arbitrator. The new agreement will take effect as and from the commencement of the first full pay period after April 17 next, and it will be terminable upon three months' notice from either side. Easter this year will, therefore, be worked under the old agreement.

The resolution passed at the end of the meeting was that the scheme adopted be recommended to the various constituent bodies for their acceptance.

NEWCASTLE MEN REFUSE COMMITTEE'S PROPOSALS.

Newcastle tramway employees have rejected the terms of the Tramways Sub-Committee. The majority against acceptance was 832, only 90 employees voting in favour of the proposal ; 46 did not vote. At a meeting of the Transport and Electricity Committee, held on Thursday evening, Alderman R. Mayne, chairman, made a statement as to the negotiations that had taken place, and indicated the course that the committee proposed to adopt in view of the ballot. After discussion, a resolution was passed, with only one dissentient, fully endorsing the action of the Sub-Committee and maintaining the decision to adopt a 48-hour working week fixed by the National Joint Industrial Council. The committee stated that the men are at liberty to resume work at any time on the conditions laid down, but so far the men have not taken any further steps.

The Lord Mayor, speaking at a dinner on Thursday night, said that he thought the action of the Tramways Committee had the full approval of the citizens. The tramway men had been offered a 48-hour week with union conditions, a wage of 67s., uniform, guaranteed employment, and eight days' holiday, for which they were paid. He compared the offer to the tramway men with the position of the miner, who worked six days a week and received 42s. The miner had a cottage and his coal allowance, which were worth 15s., so that he had for all his work, which was most arduous, 57s. It was scarcely possible for the Tramways Committee to endeavour to run a service at this juncture, but they had the sympathy of the public behind them.

TRANSPORT SUBSIDISED BY RAILWAYS.

COST OF THE ROADS.

In a recent interview, Mr. Arthur Watson, general manager of the London and North Western Railway, said that between 1913 and to-day the turnover from rail to road had been so gradual that what was virtually a revolution in transport had been achieved without the public being aware that anything particular had happened. In 1913 there were 16,700 heavy vehicles on the road, while last year there were 120,000 licensed goods motors. Each goods motor might be assumed to run 30,000 ton miles a year, and an annual licence fee of £30 on each vehicle worked out at less than a farthing a ton mile, while each of them might damage a road to the tune of 6s. a mile. The ratepayer footed the bill, and railway companies were very substantial contributors to local rates. Last year the principal railway companies paid in local rates £9,608,483 ; that is to say, while they themselves are denied road rights, they are compelled to subsidise rivals by whom last year alone six million tons of goods were diverted from the railways. They were hopeful that Parliament would adjust matters by granting road rights to the North Western and Midland group.

Tramways, we might add, have long suffered from similar injustice. They maintain a large portion of road surface in which their tracks are laid for the benefit of all comers, including railways and omnibus companies, both of which are often direct competitors with tramways.

ELECTRICITY (SUPPLY) BILL.

The second reading of this Bill was passed in the House of Lords on Wednesday. The Earl of Bessborough urged that there should be some time limit to the amount which local authorities should be permitted to borrow for the purpose of the joint electricity undertakings. Viscount Haldane contended that there was a tremendous case for the Bill, particularly in relation to the conservation of the national coal supplies. Small generating stations were always wasteful. In London there were 70 generating stations, 50 different systems of supply, 24 different voltages, and 10 different frequencies. How could they be efficient in that way ? There were 600 generating stations in the country, and their output was ridiculous when compared with modern standards. Opposition to the Bill was, he said, epitomised in a newspaper headline, "flank attack on private enterprise." Lord Buckmaster objected to placing the exercise of expert powers in inexpert hands. With the best will in the world, local authorities could make the most profound mistakes. The Marquis of Salisbury said the moment was inopportune for placing a still further burden on local rates. Lord Gainford urged that private enterprise should be given a freer hand rather than that the community should be subjected to increased rates and taxation. On a division the motion for a second reading was carried by 59 to 40.

MISCELLANEOUS NEWS AND NOTES.

Return Tickets at Worcester.—Twopenny return tickets have been introduced by the Worcester Electric Traction Company.

Chief Engineer Wanted by Omnibus Company.—In our advertisement columns applications are invited by a large omnibus company in the North of England for the position of chief engineer.

New Destination Indicators at Liverpool.—A useful type of destination indicator, which is illuminated at night, has been adopted by Liverpool Corporation tramways for erection at various termini.

Municipal Tramways Association.—The summer meeting of the Managers' Section will be held at Glasgow on Thursday, June 15, and Friday, June 16. The annual conference will be held at Newcastle-on-Tyne on September 13, 14 and 15.

Return Fares in South London.—The South Metropolitan Electric Tramways on Wednesday introduced cheap return fares on the Croydon-Sutton and Croydon-Tooting routes, as follows :—All 4d. ordinary single fares, 7d. return ; 5d. single fares, 8d. return ; 6d. single fares, 10d. return.

Railless Cars for London.—The Court of Referees of the House of Commons has decided that a *prima facie* case has not been made out by Wandsworth Council against the scheme of the London County Council for a trolley omnibus line, and that their application to be heard against the Bill cannot be entertained.

West Ham Tramway Reconstruction.—The Corporation Tramways Committee have recommended that the following schemes of track reconstruction be carried out in the financial year ended March 31, 1923 : Stratford Broadway completion, £20,736 ; Plaistow Broadway to Beckton Road, £31,768 ; doubling of track, £7,000 ; reconstruction of cars, £10,000.

Track Work at Sheffield.—Subject to the Unemployment Grants Committee undertaking to provide 60 per cent. of the wages, Sheffield Tramways Committee and the Highways Committee intend to carry out schemes of work estimated to cost over £8,000. The tramway work will consist of doubling the track on the Middlewood system at a cost of £5,100.

Electrification in South America.—The Western Railway Co. of Argentina, it is reported, will use the money recently borrowed by them for the electrification of the Buenos Aires suburban lines. It is also intended to electrify the company's line of five miles from the port to the goods terminus at an early date. Consideration is being given to the electrification of the Great Southern loop at La Plata.

Tramway and Railway Through Bookings in London.—The London United Tramways have initiated a scheme of through bookings between certain stage points on their system and important stations on the Underground railways. This will expedite the handling of traffic at the exchange points by relieving the booking offices at such interchange stations as Hammersmith and Shepherd's Bush during the rush hours.

Aberdeen Track Reconstruction Grant.—Several weeks ago an application to the Government Unemployment Grants Committee for assistance in connection with the reconstruction of certain tramway routes met with a refusal. Representations have since been made by the general manager and engineer (Mr. W. Forbes), and Councillor D. W. Beaton (convener of the Tramways Committee), with the result that a Government grant towards the work will now be given.

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Fares at Nottingham.—Nottingham tramway undertaking is not paying its way at the present fares, and the Tramways Committee have intimated that they cannot consider the possibility of the reintroduction of a 1d. minimum fare. Mr. J. Clarkson, chairman of the committee, at the last Council meeting said that the committee's next report would show a great loss, caused by the lengthened coal strike and other adverse circumstances.

Improvements at Leicester.—The central standard which stood in the centre of the road opposite the Midland railway station in Leicester has been removed and new standards have been fixed at the sides. Automatic reversers have also been fixed at the various termini. These reversers have been introduced with the idea of preventing accidents which might occur when changing the trolley with fast motor traffic coming toward the city.

London County Council.—The Municipal Reform Party, which will have a majority of about forty over the representatives of all other parties in the London County Council, have decided to nominate Mr. F. R. Anderton for the chairmanship. Among the aldermen whose election is recommended is Mr. G. H. Hume, whose services to London's tramways, as formerly for several years chairman of the Highways Committee, are well known.

Tramway System for Peking.—The *Times of India* of February 10 says it is expected that the new Peking Tramways Company will begin the construction of its track "early next spring," entirely with Chinese capital. The Peking municipality and the company have come to the conclusion it is unnecessary to order the demolition of the whole city wall. Only a certain portion of the inner city wall will be demolished. The capital of four million dollars has been fully subscribed by the Government and the Chinese Bankers' Association.

Hull Tramways Insurance Fund Relieves Rates.—The Corporation Tramways Committee have decided to devote £10,000 from the special insurance fund to the relief of the rates. This will represent a reduction of about 2d. in the £. Mr. A. Digby Willoughby, who presided, said the amount in the ordinary reserve fund of the undertaking would be, after allowing for expenditure on relaying track, about £125,000. The net profit on the omnibuses and tramcars this year would be £141, so that there was obviously nothing of this that could be given in relief of the rates.

New Development of Industrial League and Council.—An amalgamation has just taken place which will considerably widen the scope of the work of the Industrial League and Council, of which Lord Burnham and the Rt. Hon. G. H. Roberts, M.P., are joint presidents. The educational side of the League is to be widened with the assistance of Industrial Information, which for the past two and a half years under the supervision of Mr. Sydney Walton, C.B.E., has been working on independent lines, in an endeavour to extend education in economics among the mass of the people.

Proposed New Edinburgh Tramway Routes.—Edinburgh Town Council have confirmed the recommendation of the Tramways Committee that the Provisional Order now being sought should include provision for a tramway along George Street and connecting St. Andrew's Square with the West End. As stated in our issue of last week, the inclusion of this scheme in the Provisional Order does not mean that it is desired to proceed with the work; the clause is inserted only as a precautionary measure in case it is required. The Council has also agreed to seek authority for a tramway in Easter Road, at present served by omnibuses.

Surrey County Council and London Traffic.—The Royal Commission which is considering the question of the extension of London County Council's administrative area has resumed its sittings under the presidency of Viscount Ullswater. On Wednesday, Alderman E. J. Holland, of Surrey County Council, urged that the county desired to maintain its existing integrity. In the matter of transport he said that Surrey objected to the suggestion that the proposed Central Authority should be the traffic authority within the enlarged areas, on two main grounds: (1) "That it is undesirable for a municipal authority which is in itself an operating authority in an important branch of traffic to exercise control over all forms of traffic; and (2) that traffic difficulties do not disappear at any particular local government boundary."

Hull Tramways Extension Inquiry.—A public inquiry was opened at Hull on Tuesday as to the expediency of granting an Order under the Light Railways Acts enabling the Corporation to extend the tramway system to Hessle. Mr. Alan D. Erskine presided. There was much opposition, including the North-Eastern Railway Co., the Hessle Urban Council, and Mr. McMasters (owner of Hessle motor omnibuses). The representative of the Corporation stated that their object was to provide one mile and a half of railway connecting the Hull tramway system to Hessle. At present Hessle was served by the North-Eastern Railway Company, and omnibuses run by Mr. Bell and Mr. McMaster, but they contended that passengers were not adequately served. Mr. E. S. Rayner, general manager and engineer of Hull Corporation tramways, said the running of a tramway to Hessle was a sound financial proposition. The capital cost would be £30,000.

PERSONAL.

Mr. R. S. Campbell has been appointed managing director of Cammell, Laird and Company's Birkenhead works, in succession to the late Sir George Carter.

Mr. Charles I. Baker, who for the past 12 years has been traffic superintendent to the Blackpool Corporation Tramways, has been appointed tramways manager to the Ashton-under-Lyne Corporation in succession to the late Mr. Ernest Holt.

Mr. Alex Spencer has been appointed vice-chairman of the Metropolitan-Vickers Electrical Company, Ltd., in succession to the late Sir Francis Barker.

Councillor D. W. Beaton, convener of Aberdeen Corporation Tramways Committee, has been appointed vice-chairman of the newly-formed Scottish Tramways Association.

Mr. J. A. Robertson, borough electrical engineer of Salford, who has resigned, will be retained as consulting engineer for five years, at a retaining fee of £500 per annum. **Mr. E. H. L. Dickson** is to be appointed resident engineer at a salary of £700 per annum.

Railway Companies' Association.—Sir Frederick G. Banbury, Bart., M.P., chairman of the Great Northern Railway Company, has been elected chairman of the Association for the ensuing year, and Sir Guy Granet, chairman of the Midland Railway Company, deputy chairman.

Mr. W. J. A. Houston, who for many years has been London manager for the Midland Rubber Co., Ltd., has resigned, and has taken up the sole London agency of the solid tyre department of the Harboro' Rubber Co., of Market Harborough, with an office at St. Stephen's House, Embankment, Westminster, S.W.1.

Mr. J W. Hame, having resigned the position of electricity engineer and tramways manager of York Corporation, the Council propose to appoint a whole time electricity engineer and also a whole time tramways manager, preferably an engineer. The salary of the former position will be £650, and of the second £600 per annum. Mr. E. J. Nicholls has been recommended for the city electrical engineer.

Alderman Sir William E. Clegg, J.P., chairman of Sheffield Corporation Tramways and Motors Committee, is to receive the Freedom of the city on April 21 next, to mark his 70th birthday. It is chiefly in connection with the development of the tramways that Sir William's great work for Sheffield is known. He was first appointed chairman of the Tramways Committee when that body was formed in 1896, on the acquisition of the tramway system by the municipality, and it is largely owing to his foresight and ability that the undertaking has developed to its present state of efficiency. Under his chairmanship motor omnibuses were introduced, and their operation has proved popular and successful. Sir William filled the office of Lord Mayor in 1898. In 1902 he was elected chairman of the Education Committee, and since the inception of Sheffield University he has represented the Sheffield Education Committee on the University Council. In 1912 he received from the University the honorary degree of LL.D., and in 1918 was made a C.B.E. in recognition of his work as chairman of the local munitions committee.

We regret to record the death last week from an accident in the hunting field of **Mr. Randal B. Slacke,** manager and publisher of the "Engineer." Mr. Slacke joined the staff of the "Engineer" early in 1919, and filled the position occupied for many years by Mr. Sydney White. Mr. Slacke was for some years manager of the London office of Messrs. Galloways, but in January, 1917, took a commission in the Royal Engineers, and after a few months' service in Inland Waterways and Docks, he was lent to the Admiralty for duty as Deputy Assistant Director and Assistant Director of Materials and Priority.

The funeral of **Alderman E. H. Sellers,** who for nearly seven years was chairman of the Huddersfield Tramways Committee, took place at Huddersfield on March 4. A large number of municipal representatives were present, and as a tribute to his work in connection with the tramways, a detachment of tramway employees attended headed by Councillor T. Canby, vice-chairman, Mr. A. A. Blackburn, engineer and general manager, and Mr. T. Hartley, traffic superintendent. The Rev. J. W. Walls, in an appreciative address, said that Alderman Sellers was chiefly concerned with the opportunities public posts offered of doing good. His chairmanship of the Tramways Committee was a difficult and delicate task, especially during the war, and he discharged his duties in such a fine spirit that he won the esteem of those who worked with him and served under him, as well as the gratitude of the public. The town had lost a capable and faithful public servant.

FINANCIAL.

G. D. Peters & Co., Ltd., announce a dividend of 6 per cent. per annum, less tax, on the preference shares for the quarter ending March 31.

Cardiff Tramway Estimates.—The Corporation tramway estimates show an anticipated surplus of income over expenditure of £5,038 as against a loss on the period ending March 31, 1921, of £1,899.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended March 8 amounted to £92,928, a decrease of £7,014 compared with the corresponding period of last year. The route length was 155·91 miles, as compared with 152·26 a year ago. From April 1 (the commencement of the financial year) to March 8 (49 weeks) the total receipts were £4,770,504, an increase of £189,735 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended February 25 give total receipts of £356,517, or £20,750 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £183 0s. 4d. per mile of single track, and last year at the rate of £193 13s. 4d., thus showing a decrease for the week of £10 13s. per mile open.

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London United Tramways, Ltd.—The annual report shows that the traffic receipts for the year amounted to £575,837. Adding advertising and sundry receipts, there was gross revenue of £584,030, an increase, compared with 1920, of £51,287. Working expenses were £473,573, a decrease compared with 1920 of £9,023. The balance on working for the year was £110,456, being an increase, compared with the previous year, of £60,311. After charging debenture stock, and loan interest, there is a surplus of £59,474, which will go towards the reduction of the deficiency of £70,882 brought forward. As mentioned in last week's issue, the annual meeting was held on March 1, Sir William Acworth presiding.

Metropolitan Electric Tramways, Ltd.—The annual report states that the revenue for the year, apart from dividends receivable, amounted to £1,044,311, compared with £957,555 for 1920. Adding the dividend receivable upon the company's holding in the North Metropolitan Power Supply Company, and the sum brought forward and deducting all expenses chargeable against revenue, including debenture and loan interest and provision of £67,500 for reconstruction and renewals, amounting in all to £1,032,471, there remains £48,380. The directors propose to appropriate this as follows: To be placed to reserve account, £10,960; to dividend on 5 per cent. cumulative preference shares, balance of 4½ per cent. in respect of the year ended December 31, 1919, £22,500; 2½ per cent. on account of the year ended Dec. 31, 1920, £12,500; to be carried forward £2,420.

Underground Electric Railways Company.—At the meeting of the Underground Electric Railways Company of London on Thursday, Lord Ashfield foreshadowed important developments. He gave an interesting and lucid account of the position of the company, and the associated operating companies, including the District Railway, the London Tubes, several tramway companies, the London General Omnibus Company, and the Associated Equipment Co. The year just closed had been a successful one for the operating companies, especially if compared with the years which preceded it. Particularly encouraging was the advance over 1920. Among projected developments are the enlargement of the City and South London Railway's tunnels to the same size as those of the later Tubes, and the extension of the Golder's Green line to Edgware, a connection being made at Camden Town with the City and South London. For these improvements new capital will be required, and a plan is under negotiation to obtain a Government guarantee under the Trade Facilities Act for a capital sum up to £5,000,000. It was indicated also that during the year a reorganisation of the capital account of the company would be undertaken. Lord Ashfield said that at the close of the year the company's liabilities on loans from its bankers amounted to £1,100,000, and the directors thought "that the time had arrived at which a careful and thorough review of the whole financial situation should now be undertaken."

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

UNDERGROUND GROUP.—COMMON FUND COMPANIES.		
Metropolitan District Rly. Co. ..	Week ending March 4, 1922 ..	£230,155
London Electric Rly. Co.	Corresponding week last year ..	227,359
City & South London Rly. Co. ..	Increase	2,796
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	1,879,724
London General Omnibus Co., Ltd.	Corresponding period last year ..	2,049,761
	Decrease	170,037

LONDON & SUBURBAN TRACTION GROUP.		
Metropolitan Elec. Tramways, Ltd.	Week ending March 4, 1922 ..	£49,245
London United Tramways, Ltd.	Corresponding week last year ..	50,164
South Met. Elec. Tr. & Ltg. Co., Ltd.	Decrease	919
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	406,943
Gearless Motor Omnibus Co., Ltd.	Corresponding period last year ..	443,619
	Decrease	36,676

BUSINESS NOTES.

J. W. Courtenay, Ltd., of Amberley House, Norfolk Street, London, W.C.2, have been appointed sole advertising contractors for Ipswich Corporation tramways.

John I. Thornycroft & Co., Ltd., formerly of Caxton House and 10, Grosvenor Place, Westminster, S.W., have now removed to Thornycroft House, Smith Square, Westminster, S.W.1. (Telephone: Victoria 8000; telegrams, "Thornycroft" Vic. London.)

Tramcar Spares for Johannesburg.—H. M. Senior Trade Commissioner in South Africa reports (according to the *Board of Trade Journal*), that the municipal council of Johannesburg have invited tenders for the supply and delivery of tramcar spares (Contract No. 876) as follows:—Spares for Brill Truck 21E: 300 axle box springs, catalogue No. 159; 500 body spiral springs of ⅜ in. round steel; 48 semi-elliptic springs; 100 box spring caps; 12 axles 4¼ in. diameter; 24 wheel centres, 28½ in. diameter.

FOR SALE.

MANCHESTER CORPORATION TRAMWAYS.

Offers are invited for the purchase of the under-mentioned Second-hand Tramcars, *viz.*:—

8 Single-Deck Cars, complete with Peckham Trucks, G.E.52 Motors, B.T.H., K.10 Controllers.

4 Double-Deck Cars, complete with Peckham Trucks, G.E.52 Motors, B.T.H., K.10 Controllers.

The Cars may be inspected on application at the Tramways Depot, Queen's Road, Cheetham, Manchester. Offers will be considered for one or more of the Cars complete, or for the separate purchase of car bodies, trucks, or equipments. Offers should be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed "Offer for Tramcars," and received not later than 10 a.m. on Tuesday, March 21, 1922.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	Mar. 1	3,601	3,397	— 204	39¾	139,603	— 12,295
„ Motor Buses	„ 1	67	153	+ 86	39¾	9,315	+ 8,119
Ayr Corporation ..	„ 4	544	503	— 41	42	29,997	— 2,195
Barrow Corporation ..	„ 4	874	653	— 221	48	39,552	— 3,812
Belfast City	„ 3	12,007	12,277	+ 270	48	601,221	+ 51,527
Birkenhead Corporation	„ 5	2,564	2,618	— 54	47¾	125,820	— 13,170
„ Motor Buses	„ 5	370	592	+ 222	47¾	31,910	+ 12,049
Birmingham Corporat'n	Feb. 25	32,057	28,982	— 3,075	47	1,375,205	— 123,397
„ Motor Buses	„ 25	2,310	1,786	— 524	47	92,467	— 2,220
Blackburn Corporation	Mar. 1	2,409	2,158	— 251	48¾	114,664	— 10,837
Bradford Corporation..	„ 4	13,926	13,948	+ 22	48	658,575	+ 10,034
Burnley Corporation ..	„ 4	3,606	3,196	— 410	..	..	..
Burton-on-Trent Corp.	„ 5	615	590	— 25	48	29,985	+ 392
Bury Corporation ..	„ 5	2,451	2,285	— 166	48¾	116,901	— 5,524
Chatham & District ..	Feb. 23	1,592	1,444	— 148	8	11,063	— 1,516
Chesterfield Corporat'n.	„ 27	628	554	— 74	48	28,017	— 745
„ Motor Buses	„ 27	854	696	— 158	48	36,222	— 2,690
Derby Corporation ..	Mar. 4	2,295	2,089	— 206	48	103,337	— 7,544
Dundee City ..	„ 1	3,068	2,998	— 70	41¾	132,163	+ 4,949
East Ham Corporation	„ 4	2,107	2,206	+ 99	48¾	102,156	+ 2,225
Edinburgh Corp. Trys.	Feb. 25	..	11,720	..	41	516,350	+ 3,967
„ Motor Buses	„ 25	..	3,409	..	41	145,475	..
Glasgow Corporation ..	Mar. 4	45,902	45,341	— 660	39¾	1,786,193	+ 1,432
Glossop (U.E. Sup. Co.)	„ 4	230	231	+ 1	9	2,064	— 43
Halifax Corporation ..	Feb. 28	4,395	4,101	— 294	46¾	204,211	— 379
„ Motor Buses	„ 28	115	71	— 44	46¾	5,666	— 1,680
„ Railless Cars	„ 28	..	42	..	32	1,686	..
Huddersfield Corporatn.	Mar. 4	5,240	5,204	— 36	49	253,575	+ 8,115
Ilford U.D. Council ..	„ 4	1,378	1,503	+ 125	48	72,282	+ 9,930
Ipswich Corporation ...	„ 4	820	779	— 41	48	41,141	— 5,144
Isle of Thanet ..	„ 1	560	590	+ 30	21	13,216	+ 1,096
Kilmarnock Corporat'n	„ 4	374	325	— 49	41¾	14,972	— 535
Leicester Corporation..	„ 4	6,550	7,615	+ 1,065	9	64,228	+ 5,847
Liverpool Corporation	„ 4	29,958	29,438	— 520	9	257,376	+ 11,238
London County Ccl. ..	„ 8	99,942	92,928	— 7,014	49	4,770,504	+ 189,735
Maidstone Corporation	„ 2	416	395	— 21	47	22,498	— 572
Manchester Corp. ..	Feb. 25	38,758	37,507	— 1,251	47	1,820,742	+ 182,461
Newcastle-on-T. Corp.	„ 25	11,299	10,647	— 652	47	526,490	+ 4,560
Nottingham Corp.	Mar. 2	7,451	7,623	+ 172	48	329,905	— 40,843
Oldham Corporation ...	„ 5	4,408	4,562	+ 154	50	234,112	+ 2,570
Preston Corporation ...	„ 1	1,866	1,857	— 9	47¾	90,974	+ 3,224
„ Motor Buses	„ 1	..	133	..	5¾	720	..
Reading Corporation ...	„ 2	1,513	1,509	— 4	48	75,634	— 3,749
„ Motor Buses	„ 2	255	326	+ 71	48	16,176	+ 3,496
Rotherham Corporation	Feb. 27	2,707	2,210	— 497	47	106,296	— 19,635
Salford Corporation ..	Mar. 5	10,420	10,294	— 126	47¾	514,676	+ 20,893
Sheffield Corporation..	„ 5	20,019	18,754	— 1,265	48¾	935,837	— 71,742
Southampton Corp. ..	„ 1	2,928	2,871	— 57	48	141,714	— 9,101
„ Motor Buses	„ 1	184	97	— 86	48	7,190	— 4,421
Southend-on-Sea Corp.	„ 1	1,682	1,973	+ 291	48	117,675	+ 7,721
South Shields Corp. ..	Feb. 25	1,862	1,672	— 190	48	80,240	— 11,122
St. Helens Corporation	„ 28	2,098	1,649	— 449	48	85,070	— 14,904
Sunderland Corp. ..	Mar. 5	2,757	2,578	— 179	48	125,454	— 21,391
Swindon Corporation..	„ 4	366	348	— 18	47¾	18,644	+ 127
Tyneside Trys., Trds..	Feb. 22	1,145	860	— 285	8	6,201	— 2,586
Wallasey Corp. ..	Mar. 4	2,561	2,584	+ 23	48¾	133,626	+ 7,037
„ Motor Buses	„ 4	136	196	+ 60	48¾	11,312	+ 3,115
Walsall Corporation ..	„ 4	1,862	1,673	— 189	48	79,007	— 8,807
„ Motor Buses	„ 4	1,274	944	— 330	48	45,064	— 12,138
Walthamstow U.D.C....	„ 4	1,889	1,751	— 137	48	97,048	— 879
Warrington Corp. ..	„ 2	1,098	1,044	— 54	48	47,933	— 495
West Ham Corp. ..	„ 3	6,041	5,783	— 258	48	282,574	+ 2,221
Wolverhampton Corp.	„ 8	2,341	2,342	+ 1	49	113,966	— 4,262
„ Motor Buses	„ 8	610	666	+ 56	49	32,025	+ 8,943

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1920-21.	1921-22.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..	Mar. 4	£81,890	83,025	9	£738,413	+ 21,943
Ballarat & Ben. (4 wks.)	Jan. 1	5,342	5,565	40	45,852	+ 2,909
Brazilian Traction (Mlrs)	Dec.	12,600,000	15,405,000	52	170,867,000	+ 35,961,000
Brisbane	Jan.	46,280	48,790	4	48,790	+ 2,510
British Columbia $	Jan.	908,385	907,242	30	6,100,157	+ 174,401
Buenos Aires Lacroze ..	Feb.	53,952	55,227	34	460,044	+ 8,695
Burmah Tr. & Lght. Rs.	Jan.	50,035	59,362	5	350,747	+ 41,984
Calcutta .. Rs.	Mar. 4	85,052	108,937	9	942,641	+ 457,791
Cape Town	Jan.	..	30,289	..	..	..
Carthagena & Herrerias	Feb.	2,839	2,773	8	5,848	— 868
Cordoba	Dec.	19,299	22,641	39	207,992	+ 29,564
East India	Feb.	3,819	3,737	30	28,571	— 688
Kalgoorlie ..	Nov.	2,969	2,419	48	24,944	— 8,728
La Plata ..	Feb.	* 728	6,318	52	13,041	+ 5,806
Madras (2 weeks) Rs.	Feb. 28	* 9,511	39,503	8	193,602	+ 145,893
Manila .. .. $	Jan.	321,449	309,252	4	309,252	— 12,197
Montevideo	Feb.	48,119	48,111	17	180,301	— 11,462
Para	Jan.	24,231	22,966	9	45,626	— 2,858
Pernambuco	Mar. 5	4,702	3,971	9¼	34,537	— 10,020
Port Elizabeth	Jan.	..	8,120	..	..	..
Rangoon .. Rs.	Jan.	122,558	137,850	4	137,850	+ 15,292
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Jan. 14	10,692	15,389	2	30,271	+ 9,610
Winnipeg .. $	Jan.	506,229	507,047	4	507,047	+ 818

* Strike of employees.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, MARCH 16, 1922. VOL. LI.

THE OPERATION OF A SELF-CONTAINED TROLLEY OMNIBUS SYSTEM.

By J. B. PARKER, A.M.I.A.E.
(*General Manager and Engineer, Tees-side Railless Traction System*).

Up to the present only two self-contained trolley omnibus systems have been inaugurated in this country, but recently there have been numerous comments and discussions relating to the merits and future prospects of such systems. Such discussions especially concern tramway undertakings where the track is practically worn out, and the cost of renewal at the present day prices would be outrageous and prohibitive, especially so in sparsely populated districts. The writer has of late received numerous inquiries from tramway authorities, both in this country and abroad, respecting the working of the particular self-contained trolley omnibus system for the operation and management of which he has been responsible during the last 18 months. For the benefit of all interested, he has pleasure in giving a brief account of its operation since the commencement of service in November 1919.

This system is controlled by the Tees-side Railless Traction Board, which is composed of representatives of two local authorities, viz., Middlesbrough Corporation having one-third interest, and Eston Urban District Council having two-thirds interest. The joint authorities purchased the undertaking in 1919 from a private company that had been formed "pre-war" to give a service to the intermediate thickly populated, industrial districts of both areas.

Owing to the war conditions the undertaking was not completed before the negotiations were settled for the purchase by the joint authorities. The system was then eventually completed, and was officially opened by the present chairman, Councillor W. G. Grace. A service was commenced on November 8, 1919, with ten 28-seater, single deck, trolley omnibuses, over routes (shown on the accompanying map), approximately 5·1 miles in length, serving a population of approximately 45,000, and giving a ten minutes' service over the main route.

Vehicle Drawn to One Side of Road to Show Reach of Trolley Arms, viz., 14 ft. from Centre of Vehicle to the Wires.

This service was not sufficient to meet the public demands. The omnibuses were subjected to excessive overloading, which, in conjunction with the very bad condition of the roads *en route*, proved injurious

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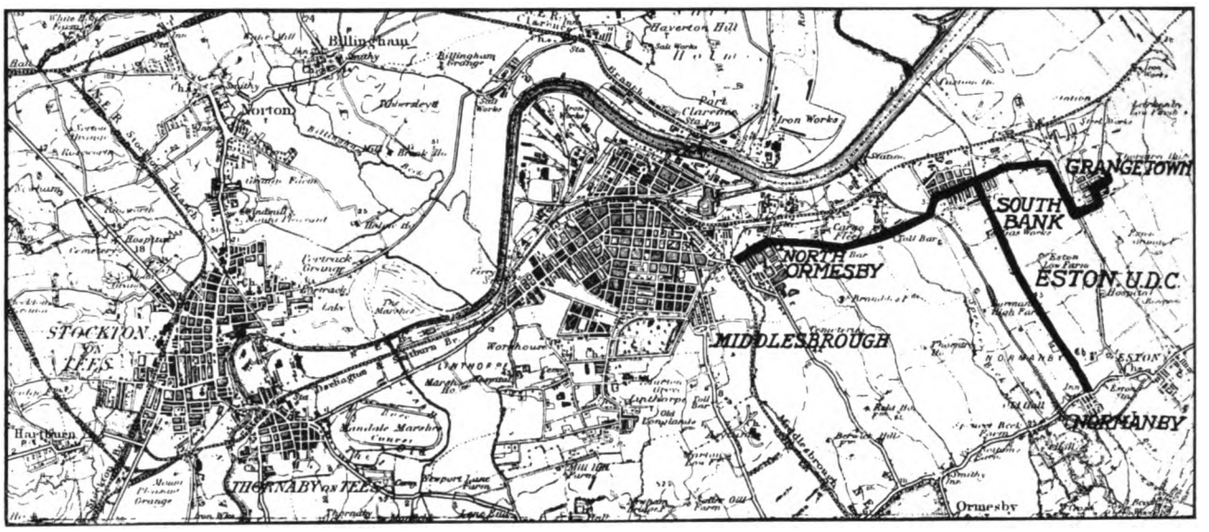
to the vehicles. In July 1920, a further six trolley omnibuses were installed, and the undertaking was then put into proper working order, giving a service which the travelling public could rely upon. Since that date a scheduled service has been efficiently maintained. Needless to say, the more efficient service gained the confidence of the passengers, and the number carried immediately increased. The recent trade disputes and slackness in trade, however, caused a gradual decrease which temporarily retarded the further advancement of the undertaking. This will be seen from the accompanying chart, which shows the number of passengers carried, miles run, and receipts per week for the first two complete years' running.



Plan of Tees-side Railless Routes in November, 1919.

First and Second Complete Years.

For the first and the second complete years, ending November 7, 1920 and 1921 respectively, the traffic return is as follows—

	First Year.	Second Year.
Traffic receipts	£27,684 2 11	£29,476 14 10
Number of passengers carried	3,270,683	3,344,276
Number of miles run	319,731	382,258
Number of units used	451,720	567,801
Average receipts per car-mile...	20·78d.	18·51d.
Average number of passengers carried per car-mile	22·34	20·26
Average number of cars in service	11	13
Average number of miles run per car per annum	29,066	29,404
Average number of units used per car-mile	1·41	1·48

It will be seen that the total traffic receipts for the two complete years up to November 7, 1921, amount to £57,160 17s. 9d., an average of 19·54d. per car mile. This amount averages £5,604 per route mile per annum over the above period, and has been achieved with the following statutory fares—

Ordinary passengers	One penny per mile
Workmen	Halfpenny per mile

As the ratio of workmen carried to ordinary passengers is one to three, the average fare charged is thus equal to ·87d. per car-mile, a figure which is probably the lowest fare charged by any authority over the same period in this country. This should not be lost sight of when comparing the financial position with similar electric traction undertakings.

The total operating costs for the two complete years equals 17·57d. per car-mile (as shown by the following table), which leaves a net revenue balance of 1·97d. per car-mile.

Revenue Account, Two Years ending Nov. 7, 1921.

Expenditure.

To Traffic Expenses—	
Wages of motormen and conductors	6·24
Cleaning and oiling of cars	·56
Fuel, light, and water for depot	·05
Ticket check, including wages of inspectors and clerks	1·14
Uniforms, etc.	·01
Miscellaneous	·32
	8·32
To General Expenses—	
Salaries of general officers and staff	·83
Rents	—
Rates and taxes	·59
Printing and stationery	·21
Fuel, light, and water for offices	·01
Accident insurances and compensations	·20
Fire and other insurances	·10
Miscellaneous	·25
	2·19
To General Repairs and Maintenance—	
Bridge	·05
Electrical equipment of line	·54
Building and fixtures	·06
Workshop tools and sundry plant	·41
Cars	4·95
	6·01
To Power Expenses—	
Cost of current at ¾d. per B.O.T. unit	1·05
Total Amount of Working Expenses	17·57

Capital Expenditure.

The total capital outlay over the above period is as follows—

	£	s.	d.
Permanent way—bridge	14,033	17	10
Electrical equipment of line	13,571	10	9
Land	2,752	4	1
Buildings and fixtures	6,428	17	2
Workshop tools and sundry plant	584	18	3
Cars (including electrical equipment of cars) ...	28,822	12	11
Other rolling stock	486	6	0
Miscellaneous equipment	550	10	0
Office furniture	98	18	6
Parliamentary expenses	3,655	3	4
Preliminary expenses	544	11	6
Total	£71,529	10	4

Equivalent to £14,025 per route mile.

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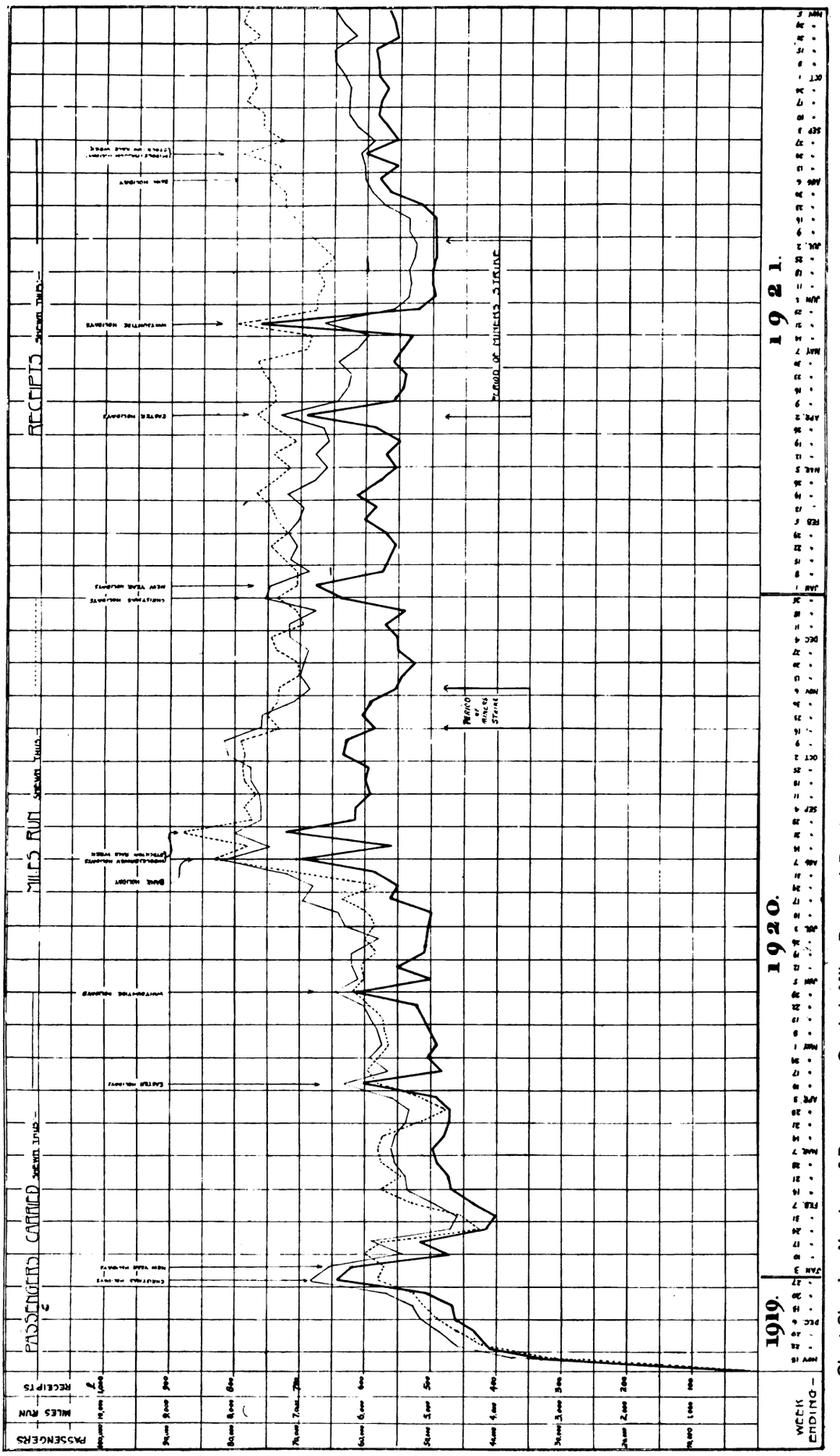

Chart Showing Number of Passengers Carried, Miles Run, and Receipts per Week for the First Two Complete Years' Running of Tees-side Railless Trolley Cars.

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The interest and redemption charges thereon are borne by the two constituent authorities. Owing to the fact that the net revenue balance of 1·97d. per car mile is not sufficient to meet such charges, an application was made to the Ministry of Transport for powers for the undertaking to increase their fares under the "Tramways Temporary Increase of Charges Act 1919." This was not sanctioned owing to the fact that, the system being self-contained and not attached to a tramway undertaking, there was no provision in the Act to allow for granting such increase of fares. Thus it requires a new Bill to be promoted to include self-contained railless undertakings before increased fares can be charged, which, in our case, is most unfortunate and unfair.

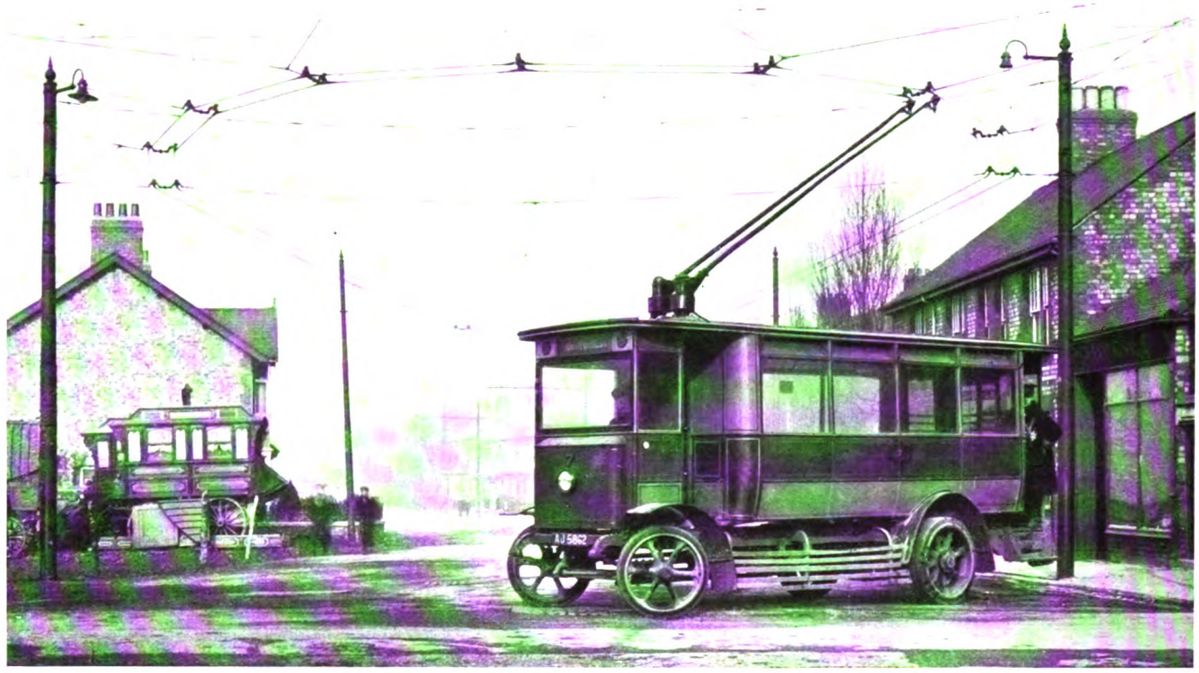
ROLLING STOCK.

The first ten vehicles put into operation were of the single-deck type, each seating 28 passengers. These are fitted with two 20-H.P. electric motors side by side in the chassis, driving on a twin worm gear rear axle by two cardan shafts with universal couplings, fitted at each end on to the motor and worm shafts. There are emergency mechanical brakes fitted at the rear end of each motor independent of the brakes fitted on to the rear wheels. This equipment is operated by hand controllers suitable for series parallel control.

Later, a fleet of six vehicles was added. These were also of the single-deck type, with seating accommodation for 28 passengers, and were fitted with one 35-H.P. electric motor driving on to a worm differential rear axle by a cardan shaft and couplings; both hand and foot brakes are operated on the rear wheels. This equipment is fitted with foot-operated controller, and is arranged for rheostatic braking.

Chassis.—These two types of chassis were each specially designed for trolley omnibuses. As such vehicles are only few in number at the present date, the necessary spare parts cannot be readily obtained; further, the cost of these spares when received is abnormally high, and not until such chassis have done sufficient service to prove the stability of the different units, can the various parts be standardised so that they can be readily obtained and at reasonable prices.

During the two years' running of such chassis it has, in my opinion, been proved that certain units would not stand up to the work with overloads and bad road conditions; therefore it has been necessary to re-design, strengthen up, and have such parts made specially to keep the vehicles serviceable. This has resulted in making the repairs and maintenance costs to cars much higher than they otherwise would have been had these units been designed and built to meet the work required of them. The fitting of two motors in a chassis which was the case with the first type of equipment not only makes the initial cost very high, but also entails a duplication of working parts throughout for maintenance. The fitting of a single motor is a much simpler method. It greatly reduces the initial cost, has less working parts, and also reduces the maintenance costs, which is a factor not to be lost sight of.



The Normanby Terminal Loop.

Referring back to the early days of building railless trolley vehicles, it appears that the designers' idea was to put on the market a vehicle totally different from any other type of transport vehicle. This they certainly accomplished, and by so doing have necessitated a repetition of costly experiments, which omnibus chassis builders had already carried out after considerable expense during many years of running experience "pre-war." During the war period valuable knowledge was further gained by them with regard to

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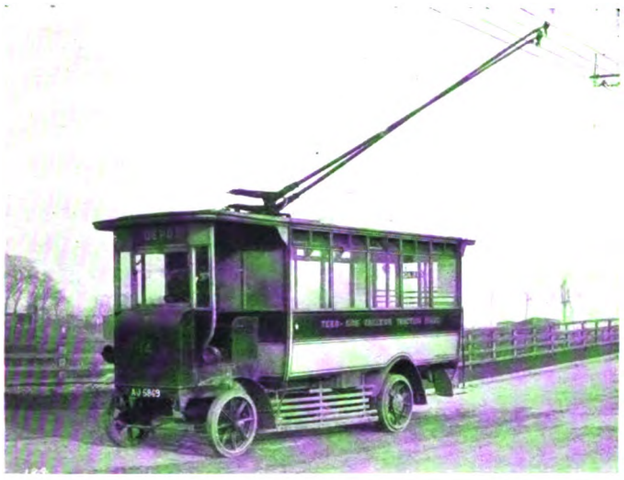
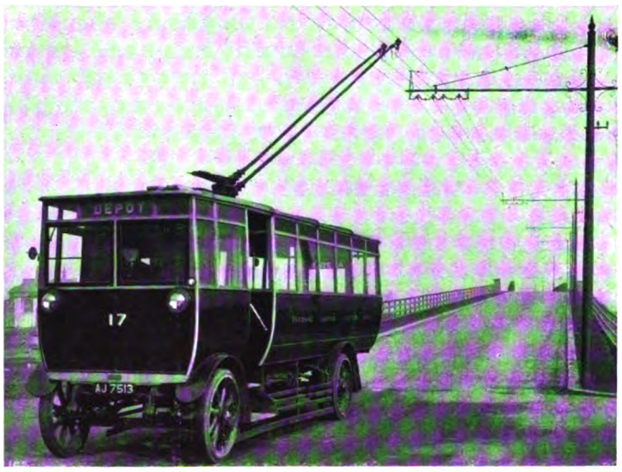
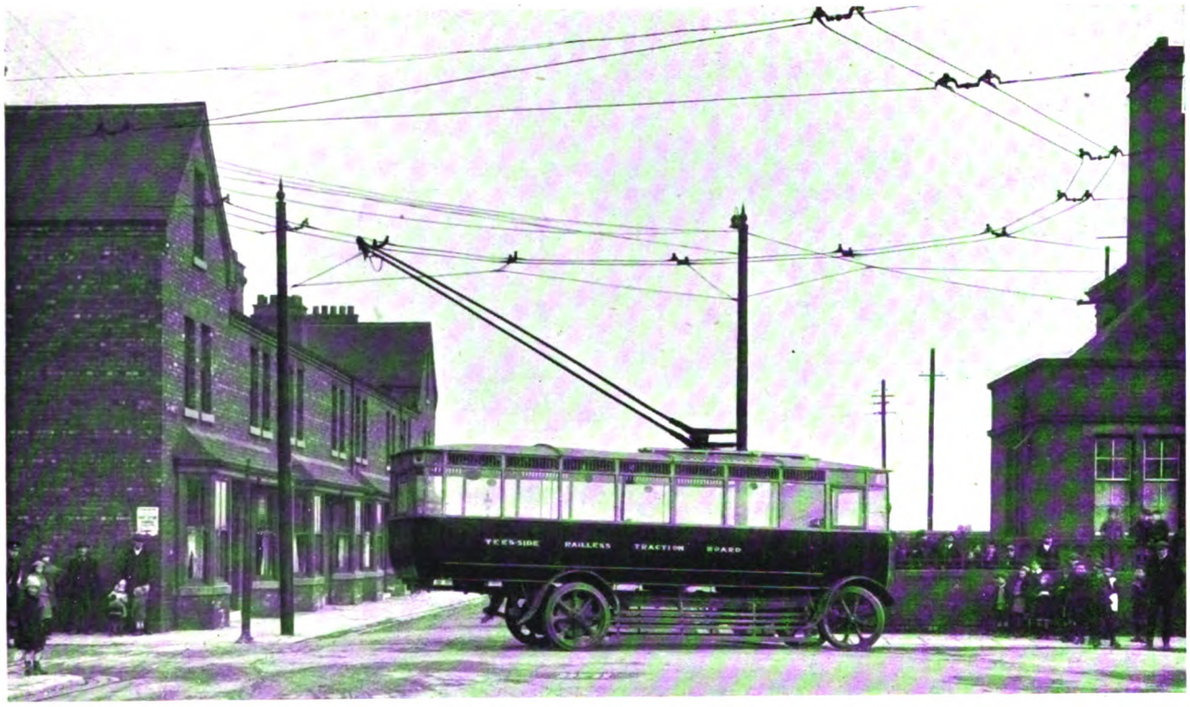


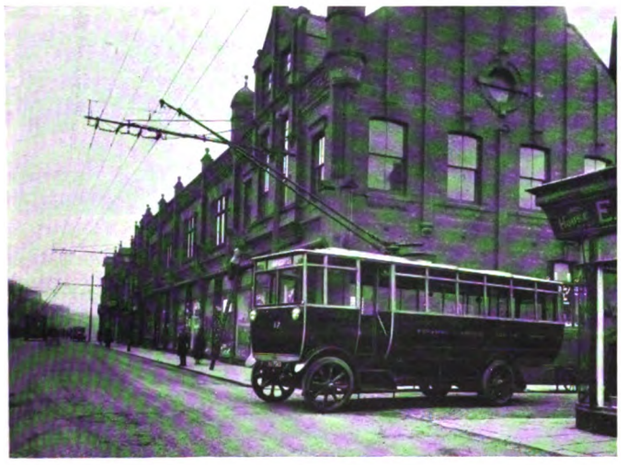
One of the Second Type of Tees-side Trolley Omnibuses.



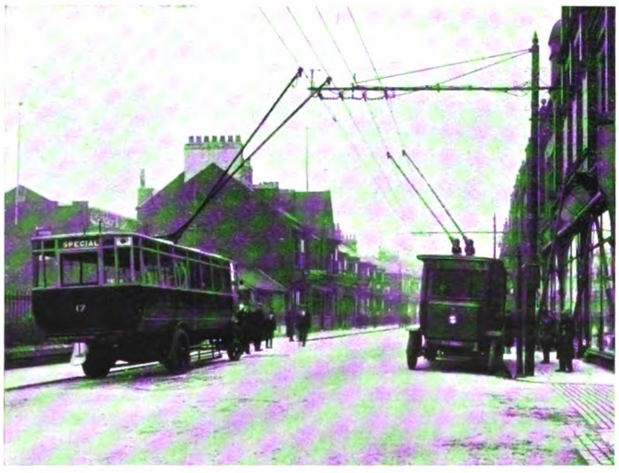
Latest Type of Tees-side Trolley Omnibus.



Latest Type of Tees-side Trolley Omnibus Rounding the Grangetown Terminal Loop.



One of the Latest Vehicles backed into a Side Street Preparatory to Turning.



The same Vehicle as that Opposite, Turned Round and Drawn up to Kerb. On the Right is an Earlier Type of Omnibus.

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the perfecting of the chassis. It appears to the writer that this valuable and costly experience should be made use of without further experimenting and wastage of money, as the approved petrol type chassis meets the requirements of a trolley omnibus when suitably fitted with reliable electrical equipment.

Overhead Construction, Showing Incidentally the Condition of the Road.

With this in view, and after the experience that has been gained on the maintenance and repairs to the afore-mentioned types of experimental chassis, I at once decided to have a trolley omnibus fitted up embodying all the main features of an approved type of petrol chassis, and fitted with a standard tramcar

Bridge Over North Eastern Railway (Eston Branch).

type of traction motor, and electrical equipment with a view to—

(1) Reducing the initial cost.
(2) Reducing the repairs and maintenance.
(3) Obtaining spare parts readily at reasonable prices.
(4) Longer life with higher efficiency by using a combination of approved type of units.
(5) Greater comfort in riding for the travelling public.

This trolley omnibus has now been completed, and is fitted with a single-deck body to seat 36 passengers, the seats having well sprung cushions and spring seat back rests. The tyres fitted are of the Dunlop super resilient type. These, together with the efficient springing of the chassis, give a most comfortable and desirable effect from a passenger's point of view, and the smooth and quiet running is very noticeable. The results up to the present are very satisfactory. The operating costs on the mileage up to date, viz., 5,000 miles, equals 12·11d. per car-mile, which is made up as follows—

OPERATING COSTS OF NEW TROLLEY OMNIBUS ON 5,000 MILES' RUN UP TO 11TH FEBRUARY 1922.

TRAFFIC EXPENSES—	
Wages of motormen and conductors	5·07
Cleaning and oiling	·53
Fuel and light	·05
Ticket check etc.	1·13
Uniforms	·01
Miscellaneous (including licences)	·74
	7·53
GENERAL EXPENSES—	
Salaries	·78
Rents, rates and taxes	·59
Printing and stationery	·21
Fuel, water, etc.	·01
Accident insurance and compensation	·20
Fire and other insurances	·10
Miscellaneous	·25
	2·14
REPAIRS AND MAINTENANCE—	
Bridge	·05
Electrical equipment	·54
Buildings and Fixtures	·06
Cars, including tyre allowance	·79
	1·44
POWER EXPENSES—	
Cost of current at ¾d. per B.O.T. unit	1·00
	12·11

OVERHEAD LINE.

The aggregate length of overhead line is 5 miles 8 chains, and covers three routes as follows—

North Ormesby to South Bank	1·92 miles
South Bank to Normanby	1·77 miles
South Bank to Grangetown	1·4 miles

The installation of the overhead equipment was commenced early in July, 1915, and completed in

Trolley Omnibus on the Approach to Bridge.

six months; thus it was erected approximately four years before the service commenced. This, of course, was owing to the war. Tubular steel poles to the British Engineering Standards Committee's specification are employed in three different strengths, light, medium and heavy, and are erected in concrete. The light poles are used on the straight, medium poles at moderate curves, heavy poles at sharp curves and at the terminal loops.

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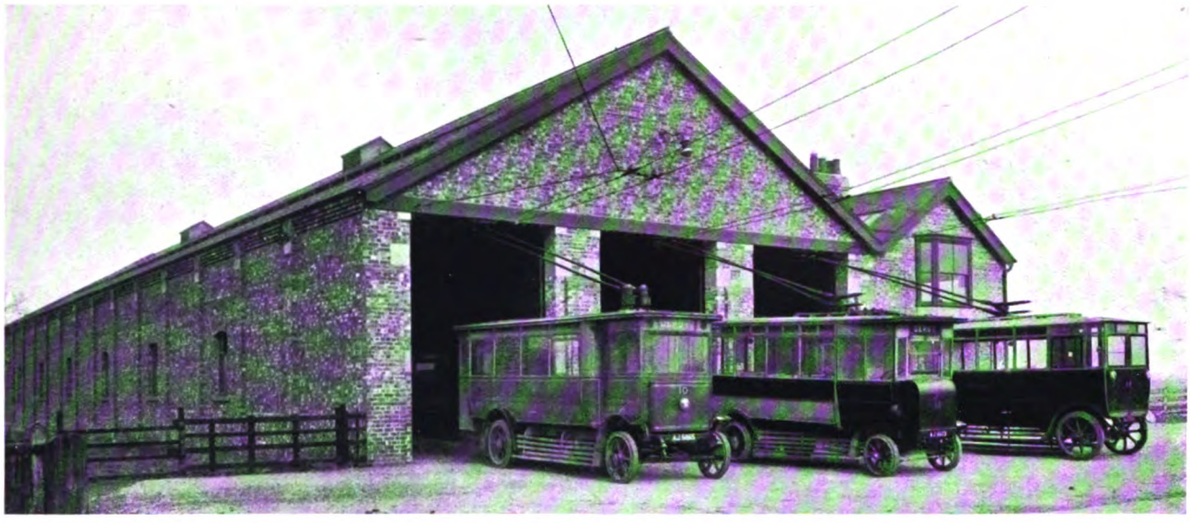
Side bracket arms and standard fittings support the trolley wires. Two pairs of trolley wires are employed throughout the whole route, the negative trolley wires being placed on the outside. The trolley wires are of 3/0 S.W.G. hard drawn copper, so arranged as to allow the omnibuses to work with under running trolleys, and are divided into half-mile sections by section insulators. The positive wires are connected across at these sections by means of insulated cable brought down the inside of the poles to switch boxes attached to the poles, and this enables the switching off of any half mile of the positive wire from the rest of the system. At each terminus the trolley wires are erected in the form of a loop, so that the omnibuses can turn completely round without changing trolleys.

The electrical energy is supplied under an agreement by a local steel works at 550 volts direct current at a cost of ¾d. per unit.



One of each of Three Types of Trolley Omnibuses at Entrance to the Car Shed.

Two ·2 square in. bare overhead feeders are carried *en route*. A telephone system is installed from each terminus to the omnibus depot and power station.

The total repairs and maintenance cost to the overhead equipment since the commencement equals ·54d. per car-mile.

CONDITION OF ROADS.

One of the main factors for the efficient and economic running of any railless vehicle—whatever it's propelling unit may be—is a properly designed and well kept road. If this be not the case, the vehicles will soon develop defects which will result in a greatly increased cost of repairs and maintenance. Unfortunately when this undertaking commenced service, some of the roads on the routes covered by the vehicles were in a deplorable condition. Up to the present only about two miles of road surface has had attention, the main portion of which has been laid with stone setts on a concrete foundation. This type of road does not give a very desirable running effect, owing to the numerous sharp vibrations set up on the vehicle, and it has been necessary to apply a top dressing of a thin coat of "Tarmac," which has made running much smoother. The remainder of the routes are still in very bad condition, especially on one section of County Road.

The vehicles therefore have been running under very unfair road conditions, and the majority of defects which have developed are traceable to such conditions. This is one of the chief causes for the costs of the repairs and maintenance of the cars previously referred to being so high, viz., 4·95d. per car-mile. The authorities have realised the seriousness of such conditions, and they intend to commence the making of good roads at an early date. At one portion of the route a bridge has been erected to obviate the level crossing of the North Eastern Railway Company. The cost of this comes in the capital expenditure, and, further, the undertaking is responsible for the repairs and maintenance of this bridge. The cost entailed thereby is included in the figures previously submitted.

In conclusion, it will be seen from the foregoing remarks that the system, up to the present, has been faced with exceptional difficulties. It is anticipated, however, that these will shortly be overcome, enabling the undertaking to become more than self-supporting, while providing a service that will meet all local demands.

THE SCOTTISH TRAMWAYS ASSOCIATION.

The first general meeting of the newly-formed Scottish Tramways Association was held in Glasgow on February 17. Mr. James Dalrymple, general manager of Glasgow Corporation Tramways, presided. Appointments were made to various offices for the ensuing year, and an Executive Committee was formed.

Councillor J. G. Fraser (Dundee) moved that a clause be inserted in the constitution making it permissible for representatives of the tramway employees to be heard on any matter affecting their interests. The motion was defeated, but it was pointed out that one of the purposes of the Association was "to consider and discuss any matters that may be referred to it from time to time," which it was considered would cover this point.

It was remitted to the Executive to consider recommendations regarding working hours and conditions of tramway employees in Scotland in substitution of the March 1919, agreement, in view of the fact that the Scottish "A" area of the Joint Industrial Council would soon cease to exist, owing to the number of resignations which had recently taken place.

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LEEDS TRAMWAY IMPROVEMENTS.

New Express Track of Sleeper Type in Roundhay Road.

Two schemes of road and tramway reorganisation undertaken by the Corporation of Leeds with the object of materially improving communication between the centre of the city and rapidly developing suburbs are now in an advanced stage.

In Roundhay Road the road widening necessary for the laying of a separate tramway track on sleepers has been carried through, and, granted reasonably good weather, the track will be laid and the junctions with the existing track at Harehills Lane and Oakwood made at the end of the present month or at the beginning of April. Ultimately it is intended that the express route shall be continued along Princes Avenue to the gates of Roundhay Park, and work is at present being found for the unemployed in excavating and levelling the land for a width of 25 feet adjoining the highway in Prince's Avenue.

The new Roundhay Road track has its origin in the fact that the existing track badly needed renewal so long ago as 1914. When the question came up for consideration following the war, the cost was regarded as almost prohibitive, and no doubt the Corporation was influenced in adopting the course now taken by the fact that vacant land occupied one side of the road. It was decided to cheapen the cost of construction by taking the tramway from the road and re-laying it on a sleeper track at the side. The track now practically completed is about three-quarters of a mile in length, and has a width of 23 feet. The work has taken well over a year, and one task that had to be undertaken was the setting back of a lodge for a distance of 40 feet.

When the connections are made the superseded length of old track will be taken up, the existing granite setts removed for use elsewhere, and the road made good with tar macadam. A 5-in. tramway rail of 90 lb. to the yard is now being laid on the new track. Reinforced concrete fence posts and wire fencing are being employed to separate the track from the rest of the roadway. It is believed that the express track will ensure not only rapid transit, but economy in first cost and maintenance, reduced noise, and the avoidance of delay to general traffic when lines have to be repaired.

View in Roundhay Road, Leeds, showing Present Tramway Track and Express Track Under Construction.

Roundhay Road is greatly used by motorists, and the possibility of danger through their getting on to the new track at night in consequence of following the tramway lines has been mentioned. Expert opinion is that the danger is mainly imaginary, and that the line of the kerb will provide a sufficient guide. If necessary, however, red lights will be provided at the junction.

"Direct labour" under the control of the Highways and Permanent Ways Department of the Corporation has been responsible for carrying out the scheme.

A route to the Middleton housing area on the south side of the city has been constructed, and a temporary light railway is serving to take building materials to the site of the houses daily, the wagons being drawn

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View showing Completed New Sleeper Track of Leeds Corporation Tramways in Roundhay Road. The Track is shown as under Construction on the opposite page.

Middleton Light Railway under Construction by Leeds Corporation.
The Track is being laid on sleepers, and the Line will serve a New Housing Area.

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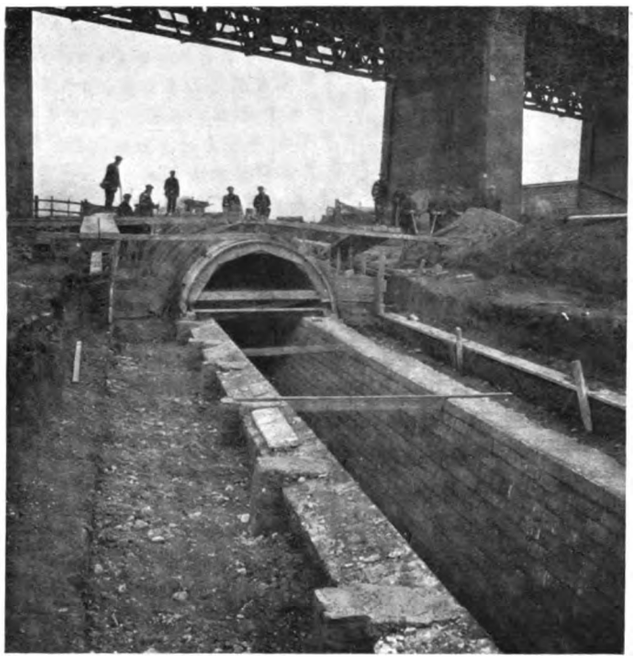
by a steam locomotive. All the formation levelling and embanking has been carried through, and the road pitched in readiness for a sleeper tramway track. When sufficient houses are erected a passenger coach will probably be attached to the locomotive for the convenience of Middleton residents, but it is expected that a year or two will elapse before the electrification of the line will be justified. For the greater part of its length the new track has been laid independently of roads upon land which was purchased from the Middleton Colliery Company at a low price contingent upon the Corporation undertaking to provide a passenger service. About 3·63 miles have been laid, and the track runs for a considerable distance through



Culverting a Stream—Bell Isle Beck—on Middleton Light Railway.

picturesque woods. Simultaneously with the purchase of the necessary land, 316 acres were obtained from the colliery company by the Wade Charity Trustees, who have since handed it to the Leeds Corporation for use as a park for the residents of the district. In the making of the track a good deal of rock had to be excavated, and it was necessary to culvert a stream known as Belle Isle Beck. At the present moment the temporary railway finishes at Hunslet, but it is intended, when the tramway track is laid, to connect up to the existing track in Dewsbury Road, about a quarter of a mile away. As the result of the new transport facilities it is anticipated that Middleton Wood will, in the course of time, become a popular resort for the residents of the congested industrial areas of Hunslet and Holbeck.

The whole of the excavation work of the scheme has been carried through by the local "unemployed," and the track work by direct labour under the control of the Highways and Permanent Ways Department of the Corporation.

Tramway and Railway Through Bookings in London.—The London United Tramways have initiated a scheme of through bookings between certain stage points on their system and important stations on the Underground Railways. This will expedite the handling of traffic at the exchange points by relieving the booking offices at such interchange stations as Hammersmith and Shepherd's Bush during the rush hours.

THE BRILL 79-E SINGLE TRUCK.

Those pioneers in truck design, The J. G. Brill Company, have recently introduced and patented a new type of single truck. Since their well-known "21-E" was produced almost every tramway has operated some, at least, of its cars on this type of truck, and many systems use no other. Notwithstanding the long and successful career of this truck, it has for some time been felt by the makers that the improvements that have been devised to meet changed conditions of operation have now made an entirely new single truck very desirable.

The new 79-E truck departs somewhat radically from the 21-E, and the most noticeable point of difference is in the small diameter of wheel. Heretofore a wheel of 33 in. to 30 in. diameter has been the rule; in this 79-E truck, however, a diameter of 24 in. has been standardised, although 26 in. wheels can be furnished where greater motor clearance is desired. By this basic change other modifications are entailed, the first of which (and a most important one) being the long wheel-base. An 8 ft. wheel-base is the minimum in this new truck. Taking the average 6 ft. wheel-base used on so many systems having sharp curves, there is a clear gain in stability and road worthiness of 2 ft.—an increase of 33⅓ per cent. The same ease of operation on curves is claimed as with the present 6 ft. wheel-base—33 in. wheel combination. Incident to this increased wheel-base is the reduction of car overhang on curves. A lowering of the centre of gravity of the vehicle is a further attribute of the small wheels, a reduction of 4½ in. in overall height being gained thereby. It is suggested that this may make all the difference in fitting top-covers to cars on many systems, at present compelled to lose traffic with open tops, due to low overhead bridges. Yet another factor is the ability to use continuous platforms in place of the heavy and expensive drop platforms necessary with the present wheel diameter. It is pointed out that a continuous platform makes a lighter yet stronger underframing, and gives the same easy step heights as at present. So much for the advantages achieved by the smaller wheel and longer wheel-base.

Coming to the truck proper, a Brill solid-forged steel sidebar, upon which Brill trucks have built their reputation, is incorporated. The absence of a top chord will be noticed. A quarter-elliptic spring is lipped under a projection of the yoke and anchored securely to the short end arm. At the ends of these leaf springs brackets are mounted on coil springs, the whole swinging on a half-ball link attached to the leaf spring. The body is mounted directly on to the brackets, and a unique spring suspension is thus obtained. Firstly, a coil spring for light loads which when compressed brings the heavier load on to the strong quarter-elliptic, thus giving the maximum of comfort in car riding under graduated load conditions. This combination of quarter-elliptic plate and coil springs, joined together by a swing-link element at the four corners of the truck, is claimed to give the easiest riding qualities ever obtained in single truck car operation, over the most uneven road bed. As most of the load is suppported on this four-corner spring arrangement, excessive oscillation of the car body is eliminated. The car body as shown is cushioned on quick-acting coil springs, which absorb the minor shocks and vibrations due to irregularities of the track, and which would otherwise be transmitted to the body

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through the slow-acting friction plate springs. The latter are not influenced by minor shocks and jolts, but they damp the action of the coil springs before the car develops an oscillating motion. The four swing-links provide the flexibility required between truck and body to neutralise the objectionable snaking or nosing of the car on bad sections of the track.

Two torque rods or links are mounted on diagonally opposite sides of the truck and connected to the body. These give the necessary rigidity in a longitudinal direction, and relieve the pressure on the journal boxes in starting and stopping. Vertical and lateral motion is also permitted by this device, dampened by friction coil springs to prevent excessive swaying, but giving sufficient lateral motion to provide easement on curves.

A notable feature of the truck is the inside-hung brake rigging, making the layout more compact, lighter, and with better equalising features, as compared with the usual outside hung brake shoes, on the ordinary single truck.

The principal dimensions of the truck are as follows:

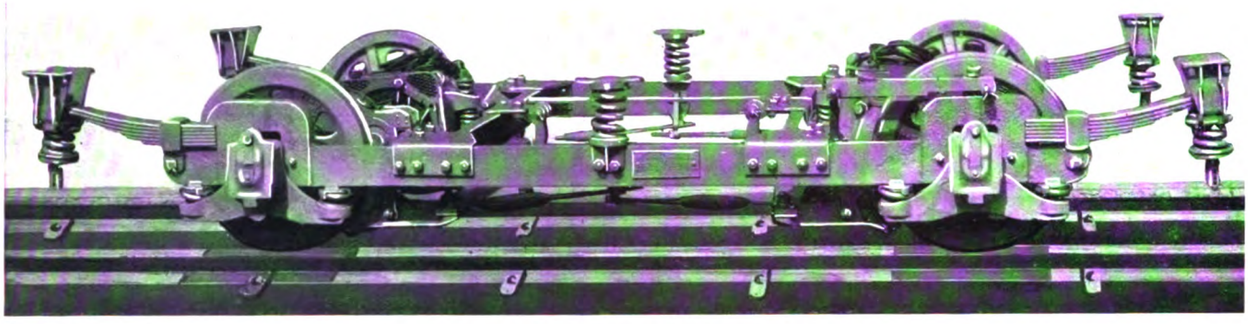
	(Metre)			
Track gauge ...	3 ft. 3⅜ in.	3 ft. 6 in.	4 ft. 0 in.	4 ft. 8½ in.
Centres of side frame holes ...	4 ft. 10⅜ in.	4 ft. 10⅝ in.	5 ft. 4 in.	5 ft. 11⅛ in.
Width over journal boxes... ...	6 ft. 0⅝ in.	6 ft. 0⅝ in.	6 ft. 6 in.	7 ft. 1⅛ in.
Length of axles friction journals	5 ft. 5⅝ in.	5 ft. 5⅝ in.	5 ft. 11 in.	6 ft. 6⅛ in.
Wheel-base ...	8 ft. 0 in.	8 ft. 6 in.	9 ft. 0 in.	—
Total length ...	13 ft. 6 in.	14 ft. 0 in.	14 ft. 6 in.	—
Spring base ...	13 ft. 0 in.	13 ft. 6 in.	14 ft. 0 in.	—

Wheel diameter, 24 in. or 26 in.
Height of truck with empty car body, 23 in. or 24 in.

It has been repeatedly stated that the success of the One-man Safety Car in the United States has been largely due to its riding qualities. If this be true, then its running gear stands revealed as the secret of a success which has revolutionised electric traction in other fields. As this 79-E truck is a more robust edition of the truck now used under 4,000 Birney "safety cars," it has gone well beyond the realms of experiment, and its behaviour during the past six years brings it within the category of proved designs of exceptional merit.

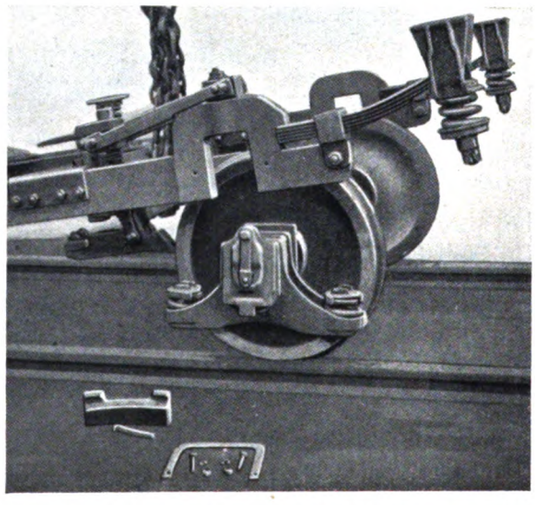
Built on strong rugged lines, this new truck is capable of carrying body and passenger loads equal to those now carried by the Brill 21-E. Lengthening the body, due to the longer wheel-base with the greater passenger capacity resulting, is not encouraged by the makers, but it obviously holds out interesting possibilities. This new Brill truck therefore, fitted with the highly developed light-weight motors (a range of which now obtainable run up to 50 H.P. on 600 volts) presents to tramways managers a striking combination of modern developments in traction matters.

Two strong channels form the crossbars, being secured rigidly to the sidebars by means of the heavy gusset plates bent over and bolted firmly to the side frame. These cross members are placed close to the wheels to give the necessary rigidity to the truck frame, and retain it in alignment. These crossbars also support the brake gear through the medium of half-ball links at the centre of the truck. This brake gear is equipped with the Brill patented half-ball noiseless link device, the half-ball link forgings having a machine fit in glass-hard electric steel castings, the whole kept in correct tension by a spring on a bolt, and thus being automatic in adjustment for wear.



The New Brill Single Truck 79-E.

The motor support is carried from a bracket mounted on the crossbar, having upper and lower coil springs. The coil spring shown at the centre of the sidebars is a balancing spring to support the underframe at this point. This will be more clearly understood when it is borne in mind that the car weight is carried mainly on the end springs. The journal boxes are of the Brill standard wide-wing pattern. The small illustration shows the facility with which wheels and axle can be removed from this truck.



Quick Release of Wheels and Axles Effected by Removing Pedestal Strap and Brake Shoes.

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THE WITTON WORKS OF THE G.E.C.

NOTABLE DEVELOPMENTS.

The avowed object of the policy of the directors of the General Electric Company, Limited, has been to develop every branch of electrical work in order that the company should be in a position to manufacture from start to finish, and entirely within its own organisation, the heaviest electrical units commercially possible, together with the necessary switch gear and apparatus, constituting complete installations. The engineering works of the company at Witton, near Birmingham, as they exist to-day, give proof of the steady progress made during the past few years and of the successful endeavour to achieve the position indicated. For many years the Witton works have been known as one of the most important groups of factories in the world engaged in the manufacture of electrical apparatus, and the recent extensions to the heavy engineering departments have increased the resources and capacity of the works to such an extent that they are now able to design and construct electrical machinery and control gear for the complete equipment of power stations, railways, ships, collieries, iron and steel works, etc., and to carry through in their entirety electrical and engineering schemes of any magnitude.

To celebrate the twenty-first anniversary of the commencement of the building of the Witton works, the directors of the General Electric Company recently entertained a number of Press representatives and gave them the opportunity to see for themselves how well equipped the company now is to compete for the world's work. The extensions at Witton comprise seven new buildings—switchgear works, standard motor works, administrative offices, development department, moulded insulation works, enamelling and plating works, and the club house, while the foundry, main engineering works, and small motor works have had several new bays added. Without going into details of the actual area of those extensions, we may say that the works, as a whole, have been rather more than doubled in size, but the greater facilities provided have undoubtedly increased the efficiency of the works by considerably more than this ratio.

Imposing as this group of works undoubtedly is, in order to appreciate fully the extent of the self-contained organisation of the G.E.C., it is necessary to consider the full range of factories and works now included in the company's manufacturing arrangements. In all there are some 20 works, each devoted to specialised production of one or more classes of electrical or mechanical apparatus, and it is in these co-ordinated factories that the strength of the company lies, for they make it possible for the largest contracts to be undertaken, the whole of the plant and apparatus required being manufactured in the company's own workshops.

HEAVY ENGINEERING PLANT.

The most important of the new buildings is that which now forms the main engineering works, where all classes of electrical machinery of the heavy type are constructed. These include turbo-generators, slow-speed generators for reciprocating steam or internal combustion engine drive, rotary converters and large motors for driving many varieties of industrial plant. At the eastern end of the turbo-generator bay, which is separated only by a road from the foundry, the stator castings and rotor forgings are brought in and are there subjected to the necessary milling, boring, turning and slotting operations, for which a range of specially-designed machine tools has been installed. It is worthy of note that the G.E.C. have always made use of the solid rotor for their high-speed alternator, and the success achieved by these machines fully justifies this policy. After the machining is completed, the stator cores are built up, clamped in position and passed to the winding section, together with the rotor, for subsequent assembly, test, and despatch. Fig. 2 shows the rotor of a 7,500 K.V.A. turbo-alternator with the coils being placed in position, and Fig. 3 a rotor for an 8,000 K.V.A. turbo-alternator at a later stage in its manufacture, when the end shrouds are being tightened. Both these rotors are designed to run at a speed of 3,000 revolutions per minute. A

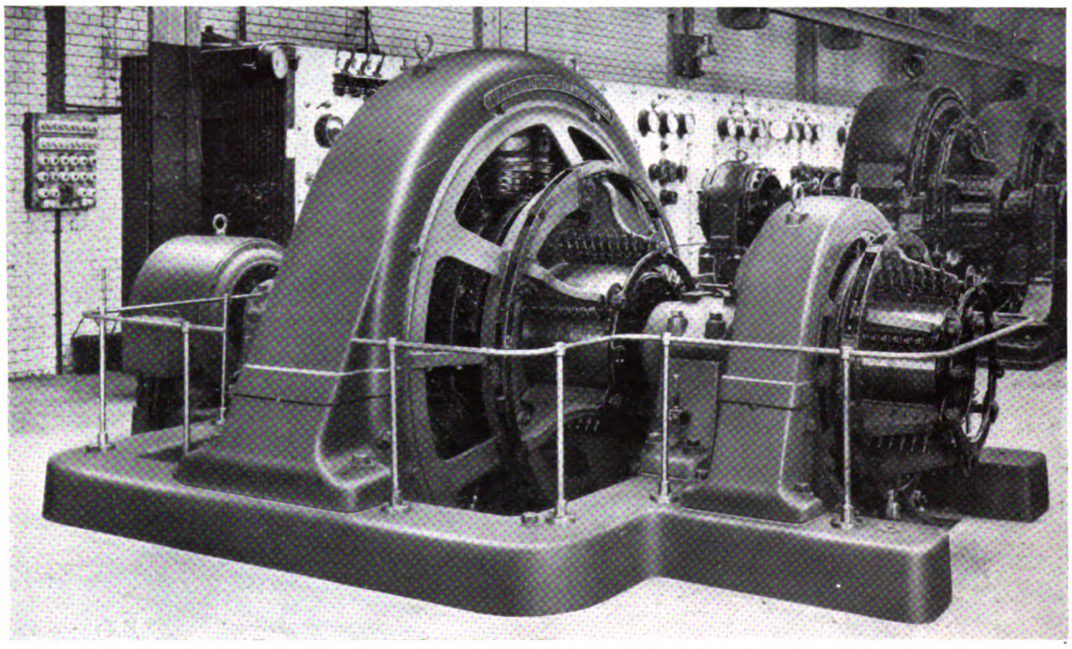

Fig. 1.—1,000-k.w. Rotary Converter for Glasgow Corporation Tramways.

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feature of the G.E.C. turbo-alternators of 6,000 K.V.A. and upwards is that they are all provided with embedded temperature detectors.

Amongst the units seen in various stages of construction were one for the Borough of Marylebone, rated at 10,000 K.V.A., and another for the Bury Corporation, with an output of 12,500 K.V.A., each to run at a speed of 3,000 revolutions. Others noted were two of 6,000 K.V.A. for Guest, Keen and Nettlefold, one of 7,500 K.V.A. for Bolckow, Vaughan and Company, and two of 6,000 K.V.A. for Darlington and Newport Corporations, while three sets each of a rather less capacity were in an advanced state of construction for the City of Pretoria, South Africa, and the City of Auckland, N.Z. Several other units with outputs of from 4,000 to 22,500 K.V.A. were for British Corporations, iron works, collieries, etc. The majority of these were designed to run at a speed of 3,000 revolutions per minute. The three other bays of the main engineering works are equally well situated in relation to the foundry. Two of these are equipped with modern machine tools capable of dealing with heavy parts for large slow-speed generators, rotary converters, induction motors, etc., while the other is devoted to winding, special provision being made for impregnation. Some interesting samples of the G.E.C. rotary converter, which is now widely installed in power houses and sub-stations, were seen. These included four for the City of London Electric Light Company and two for the Charing Cross and West End Company. An important feature in connection with the G.E.C.

Fig. 2.—Rotor of 7,500 k.v.a. Alternator Under Construction.

converter is that with each machine a self-synchronising panel is supplied, which embodies many valuable patents held by the company and for which several important advantages are claimed. The windings of the starting motor are not used as reactances for the main current, and the operations are extremely simple and foolproof. A rotary converter for the British Mannesman Tube Company was of special interest, inasmuch as it had a double commutator, necessitated by the fact that the machine had to deal with a current of 5,000 amperes from the D.C. side. Our illustration, Fig. 1, shows a 1,000 K.W. converter, 480-550 volts, 25 cycles, 600 revolutions per minute, for Glasgow Corporation Tramways.

Large motors, from 500 to 4,000 H.P., for rolling mills in various stages of construction, as well as many other interesting machines, were seen. They included the "Witton" three-phase totally-enclosed motor, capable of rapid dismantling, the "Kapp" phase advancer for power factor improvement and the induction type synchronous motor.

The Witton foundry is believed to be the largest in the Midlands. It is well equipped with cranes, moulding machines, and all the necessary plant for rapid production and ease of manipulation. Each bay is arranged for the production of a special class of casting; the one for heavy castings is equipped to deal with the largest turbo stators, the preparation for such

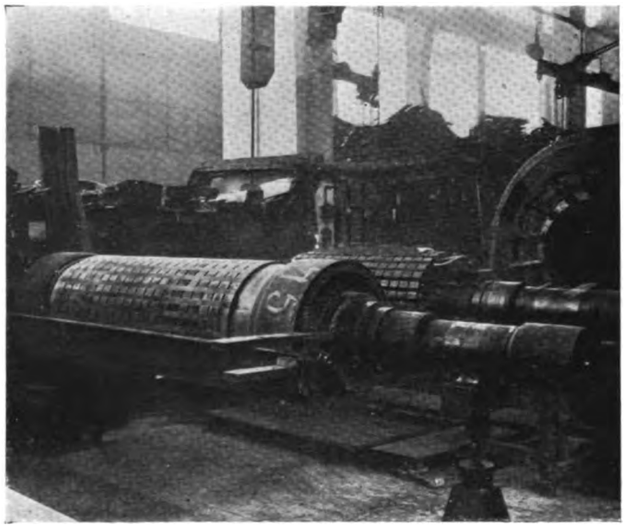

Fig. 3.—Rotor of 8,000 k.v.a. Alternator.

an example being shown in Fig. 4. The metal for this bay is supplied from three cupolas, each capable of melting 25 tons of pig iron per hour. Much use is made of power-operated moulding and jar ramming machines, the largest of which can ram a box of sand, the total weight of which is ten tons. The compressed air plant for operating the foundry machinery is housed in a separate building.

Switchgear Works.

An idea of the importance of the switchgear department of the Witton works will be gathered from the fact that the new building devoted to the manufacture of this class of plant covers an area of 100,000 sq. feet. The building is admirably situated and planned for the rapid progress of work through the shops. It is equipped with the latest tools and appliances and contains many novel features in its lay-out. A fully equipped test department is situated at the end of the works at right angles to the bays, where pressure is available up to 100,000 volts. Switchgear manufactured in these works ranges from starters and controllers to the heaviest types of oil circuit-breakers up to 33,000 volts. Much of the work in progress was for the control of the machines seen under construction in the main engineering works. A main switchboard, drum controller, contactor panels and other items were all part of the same contract as the large D.C. rolling mill motors, while a large 220 volt D.C. switchboard was in the same contract as the 1,000 KW. rotary converter under construction for the Sunderland Corporation sub-station. In this connection it is worthy of remark that the G.E.C. have already supplied to this Corporation a 10,000 K.V.A. turbo-alternator, two 1,500 KW. motor generator sets with

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"Kapp" phase advancers and various other items of switchgear.

An important contract now being carried out in these shops is for the complete equipment of a special switchgear house for the Metropolitan Railway, for which many items were on view. The main section of this contract calls for 11,000 volt gear to control one 12,000 K.V.A. alternator, five 5,000 K.V.A. alternators and 15 outgoing 300 ampere feeders. The switchgear house is to be constructed in three storeys, the bus-bar chambers on the top floor, oil switches in the middle, and instrument transformers below. All the switches are to be electrically remote controlled

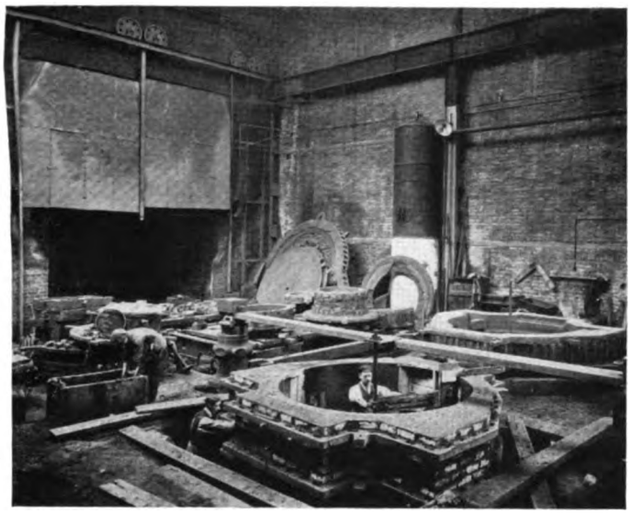

Fig. 4 —Preparation for Casting a 15,000 k.v.a. Turbo Stator.

from special operating panels on the third floor. The high tension gear will be in brick cubicles, the oil switches having a breaking capacity of 350,000 K.V.A. Oil switchgear of the higher voltage type was seen in course of construction for controlling 33,000 volt apparatus to be installed in South Wales. This is similar to a number of sets recently supplied to a South American mining company for use on a similar circuit, but with a braking capacity of 800,000 K.V.A. Several examples of the truck type cubicle switchboard were being erected. This is built in sizes suitable for voltages up to 11,000. An illustration of a board just completed for the Bloemfontein Municipality is shown in Fig. 5. Other interesting types of switchgear included oil-immersed rotor starters, oil-immersed drum controllers and oil switches of various patterns.

A special type of panel which attracted attention was that for testing the apparatus of the G.E.C. biassed differential system of protection (McColl's patents). It is claimed for this system that it makes possible a degree of sensitivity not attainable with any other protective system. Many other lines of ironclad switchgear suitable for all standard voltages were seen, as well as a large number of fuse boards, motor starters, drum type controllers, contactor gear and other standard lines with which the name of the G.E.C. is familiarly associated.

Standard and Small Motors.

Two large works, quite distinct from the main engineering works, are devoted to the manufacture of electrical machines other than those of 500 H.P. and upwards. The standard motor works has been specially equipped with a view to the rapid production of standard units from 10 H.P. to about 500 H.P., all special machines being constructed in the main works. The works are laid out in three principal bays, with a large rough casting store running the full width of the works at the foundry end. The outside bays are for winding and machining respectively, the various parts flowing into the centre bay for assembly, test and dispatch. The small motor works is reserved for fractional horse-power motors and small motors and generators up to 10 H.P. In each of these works the grouping of machine tools and the general lay-out has been so arranged that handling of parts is reduced to a minimum, while the use of jigs and templates not only makes for rapid production but a degree of accuracy which ensures interchangeability of parts. Buffing, plating, enamelling and other necessary but subsidiary processes are carried out in shops specially designed for these purposes, with due regard to the health and well-being of the operators. All enamelling operations are done by compressed air, both in these shops and those attached to the switchgear works.

Development and Research.

The G.E.C. central research laboratory was founded some years ago at Wembley and is to-day a highly developed organisation for scientific research, which undertakes the investigation of the more abstruse manufacturing problems encountered by the various associated factories. At each of these works, however, a development department has been established, which, working in conjunction with the central laboratory, is able to ensure that every new departure shall be based upon careful experiments carried out in its own development department. This department at Witton, with its electrical and magnetic testing section, its mechanical test, chemical laboratory and roomy workshops were all open for the visitors' inspection. Each section is equipped with the latest scientific apparatus, pressures up to 50,000 volts being available.

Social and Welfare Work.

No description of Witton works can be complete without reference to the excellent care which has been taken to provide for the well being of the workers in every department. The system of lighting, heating, ventilation and sanitary arrangements is such that at all

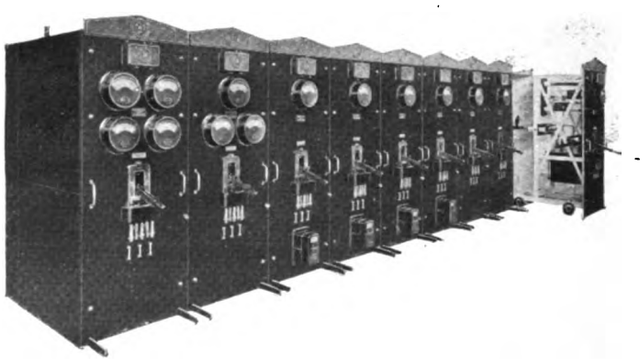

Fig. 5.—Truck-type Cubicle Switchboard—Bloemfontein Municipality.

seasons of the year the conditions under which the work is carried on are wholly admirable. As a memorial to the many who left Witton to take part in the Great War and did not return, the company has erected a magnificent new club house and laid out playing fields covering many acres. These are fully utilised by the workpeople during their meal times and leisure hours.

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ENGLISH ELECTRIC ROTARY CONVERTERS.

At the present period, when British manufacturers of electrical engineering plant have to contend with foreign competition which is aided by the post-war economic conditions, a brief account of one branch of the operations of the English Electric Company will be of interest. The description will also be useful as a reminder to municipal authorities and others of the enterprise which the English Electric Company, Limited, have shown by laying themselves open to supply every electrical engineering requirement of importance.

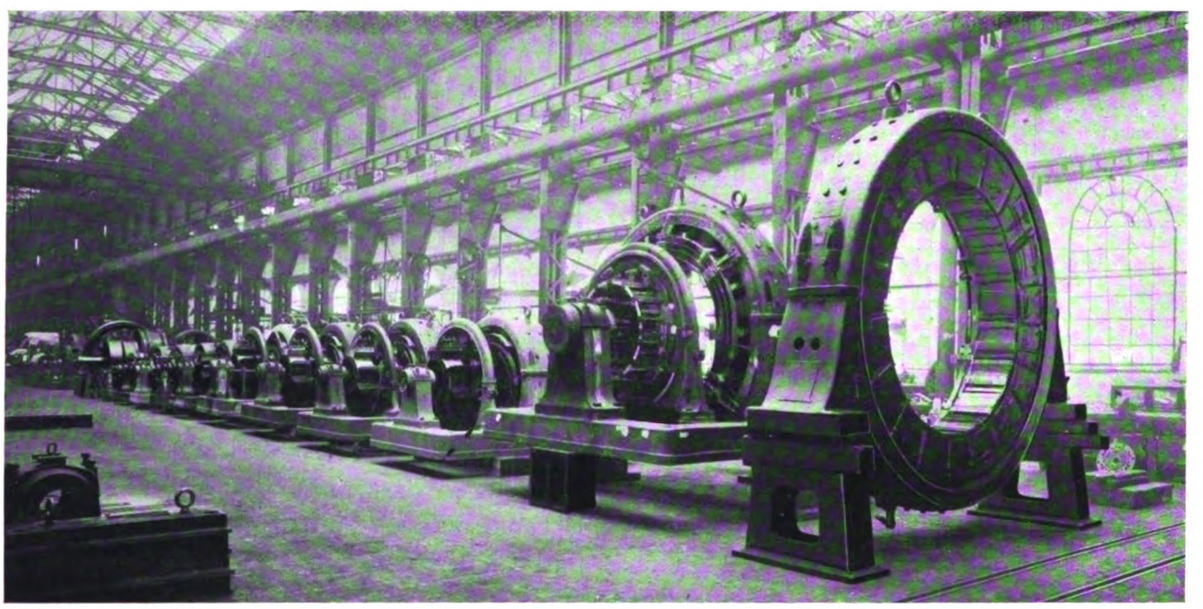
The illustration on this page shows a number of rotary converters in various stages of construction at the Stafford works of the English Electric Company, Limited. The frame on the right-hand side of the picture belongs to a very heavy current low voltage machine designed to give a direct current supply for rolling mill work. The armature belonging to it may be seen at the extreme left-hand side of the picture. This is designed to carry about 6,000 amps., and the special double commutator construction can be clearly seen.

Next to the frame of this machine are a number of parts of a 1,500-KW. machine for municipal service, designed to run at 428 revolutions per minute. Still proceeding to the left there will be seen machines of 1,100 KW., 1,000 KW., 500 KW., 250 KW., and 200 KW.

In addition to the above, four or five more machines were running on the test bed at the time, varying in output from 1,500 KW. down to 200 KW., and the modifications in design between the largest and the smallest sizes of some 15 machines dependent upon the conditions of service and the frequency of the alternating current supply form a most interesting and attractive study.

We understand that the English Electric Company intend to build all their rotary converters for industrial or municipal service at the Siemens Works, Stafford, which are exceptionally well laid out to deal with a wide range of machines, suitable for the varying conditions of periodicity and voltage met with in general municipal and industrial service.

Another part of the same works is devoted to the manufacture of the whole of the A.C. and D.C. switchgear necessary to control the rotary converters, while the step-down transformers for working in conjunction with the converters are manufactured by the same company at their Coventry works, so that the English Electric Company are in a position to furnish the entire equipment of a rotary converter sub-station from the products of their own factories.



Stages of Rotary Converter Construction at the E.E.C. Works at Stafford.

PASSING TRAMCARS IN LONDON.

Mr. Neal, in the House of Commons on February 25, said he had received representations from the London County Council as to the danger of other traffic passing tramcars which have stopped for the purpose of landing or embarking passengers at regular stopping places fixed by the police for these purposes, and it had been suggested that a regulation should be made requiring vehicles passing on the near side of a stationary tramcar to slow down while doing so. It was doubtful whether the Ministry of Transport had power to make such a regulation, and in any case it seemed undesirable to do so. It would be difficult to enforce it effectively in view of the large number of tramcar stopping places.

Sir H. Brittain inquired whether, seeing that the suggested rule was being carried out throughout the whole of the British Empire and the United States, it should be difficult to enforce it in London. Mr. Neal replied that the police had a very clear view that it would lead to more accidents than it would prevent, and there was, moreover, great doubt whether there was any legal authority in the Ministry to interfere.

Sir F. Hall asked whether Mr. Neal remembered that he sat on the Select Committee with regard to the case of the general condition of London traffic, and did he propose to take any steps to carry out the suggestions of the report of that committee? Mr. Neal replied that as to the Select Committee presided over by the late Mr. Kennedy Jones, M.P., it had not been found possible to bring its recommendations into operation. They would need legislation, and he thought the whole question of dealing with London traffic was inextricably mixed up with questions of local government in London.

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THE EDITOR will be glad to consider articles by experts. All information of a practical character relating particularly to the engineering and operating branches of transportation will receive prompt attention. Original illustrations will also be welcome.

LONDON, MARCH 16, 1922.

The Brighton Railway Electrification.

The London, Brighton and South Coast Railway Company have again had to postpone their scheme for electrifying the main line from London to Brighton, but they intend to go on as circumstances permit with the conversion of their suburban lines. They have abandoned the promotion of a Bill in Parliament to authorise the raising of a loan for electrification, because there were objections from existing stockholders. At the annual meeting the chairman, Mr. C. C. Macrae, said that the board had determined that until the times became more favourable for raising capital the extension of electrification will be confined to those sections of the suburban system where the needs are greatest. If the company, he stated, were independent they could go ahead vigorously with the work, but the Railways Act of 1921 has a paralysing effect on independent action. Under that Act the company is to be amalgamated with the South Eastern and Chatham and the London and South Western Companies. In negotiations for that end they were confronted with the contention that no electrification work involving large expenditure should be undertaken by any one of them without the consent and approval of the others. As the companies use different systems, that is a bar. He hoped the Government Committee on the subject would be able to report on the steps it may be advisable to take on the several electrification schemes they have in contemplation, and to suggest a solution of the deadlock. It will thus be seen that the position, so far as the Brighton company is concerned, is pretty much one of "as you were."

South Eastern Railway Electrification.

It is never safe to prophesy, but it is quite safe to say that there is a good prospect of the electrification of the suburban lines of the South Eastern and Chatham Railway being begun before long. A definite statement was made by Mr. Cosmo Bonsor, the chairman, at the annual meeting of the two associated companies. It has been said that the two companies do not possess Parliamentary authority to use electric traction, but the delay which would arise before such powers could be obtained is to be prevented. The Ministry of Transport have powers to make orders for the development of railways, and we are informed that some time ago the Ministry granted an Order for this electrification scheme, the work to be carried out and the equipment for the time being to be owned by a construction company. The South Eastern and Chatham Railway lost its once splendid suburban passenger traffic owing to the competition of electric tramways and motor omnibuses, and the latter are now threatening some of its traffic beyond the London suburbs. To meet that, and to win back lost traffic, electrification is necessary. It was the passing by Parliament of the Trade Facilities Act last autumn which gave the two companies an opportunity. They applied for a Government guarantee under the Act of principal and interest of new capital to be raised for the work, and Mr. Cosmo Bonsor stated that the application met with very favourable consideration. It appears, however, that at the time when the chairman spoke a final decision had not been arrived at by the Government, nor had it at the time when these notes were written, because in the House of Commons on March 6, Mr. Neal, Parliamentary Secretary to the Ministry of

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Transport, stated in reply to a question that the Advisory Committee under the Act had applications for guarantees from the South Eastern and Chatham and the London electric railway companies under consideration. It is apparent, however, from the tone of Mr. Bonsor's speech, that he had no doubt the result would be favourable, and it is much to be desired that it should be so, for the gain both to the companies and the public would be very great.

The Construction Company.

Mr. Bonsor stated that a private construction limited company will be formed with borrowing powers sufficient to cover the cost of construction, the money borrowed to carry the Government guarantee, and it will thus be obtained on the most favourable terms. The works will be the property of the construction company, and will be leased to the South Eastern and Chatham Railway for 25 years at a rent sufficient to repay the capital and interest at the expiration of the lease, when the works will become the property of the two railway companies. Mr. Bonsor considers that the opportunity is unique, the arrangement good, and the figures as to results are estimated to be extraordinary. Taking the present level of fares and a very moderate increase in the number of passengers, with a certain ascertained decrease in working expenses, the directors estimate that in the second year of working there will be a good margin of profit. There seems to be justification for these rosy views, especially when it is remembered that this railway has a number of stations in the centre of London, giving a wide choice to passengers. The fast and frequent service of electric trains will do the rest. The two companies may be congratulated also on the ingenuity of their scheme, which in the long run, if things go as expected, will leave them with the electrical equipment of their lines free from any capital liability. It may be recalled that it is proposed to use the high-tension direct-current system of traction, and this will be the largest installation of the kind in the country. It remains to be seen what proposals may be put forward by the Government Committee of experts which is considering the question of co-ordinated electrical working with the London and Brighton Company, which uses single-phase current.

Light Car Era in America.

In the United States the light car—a vehicle distinct from the safety car—is being successfully used on inter-urban lines not only for the reduction of working expenses but for meeting motor omnibus competition. Several instances were brought to the attention of the annual convention of the Central Electric Railway Association held recently at Indianapolis. One of the examples was that of the Northern Ohio Traction Company, which serves a closely built up territory, more than half of the 18 miles of single track running through city streets and suburban districts where high speed is not permissible. There is one 12 per cent. grade about 2,200 feet long, and many easier gradients with numerous curves. The 62,000 lb. cars, equipped with G.E.-57 motors and K-34D control, were replaced by centre entrance cars, having 26 in. wheels, and weighing 41,900 lb., with a seating capacity of 54, as against 46 in the discarded type. The reduction in the wheel diameter from 36 in. to 26 in., taken in conjunction with the correspondingly smaller bolsters and trucks, resulted in a reduction in the height of car floors of 14 inches, thus making it much easier and therefore quicker for passengers to enter. The centre entrance gives a saving in the length of time required for stops, passengers being able to enter and leave simultaneously. The control is interlocked with the doors, and door signals only are used in starting. These arrangements reduced step accidents to the minimum, thus effecting a great saving. Unlike the old stock the new cars were equipped for multiple-unit train operation, with quadruple Westinghouse 532-A motors of 50 H.P. each and H.L. control. The grades prevent the use of trailers. Summarised, the annual saving of operating expenses is as follows—Energy consumption, 18,578 dollars; maintenance of car equipment, 19,658 dollars; maintenance of track, 6,770 dollars; reduction of crew expense by train operation, 2,422 dollars; total annual saving, 47,428 dollars. The outlay for the fifteen new cars at 15,109 dollars each was 226,635 dollars, thus showing a return on the investment of 19·36 per cent. The railway on which the light cars were run was described as the only one of the undertaking on which "the earnings have maintained a straight line across

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the chasm of business depression that has swept Northern Ohio during the last eighteen months." Another consideration is that the cars prevented diversion of traffic to a motor omnibus service which parallels the line the entire distance. The omnibus question was sensibly treated at the conference by President Blinn, who remarked that densely populated, outlying districts, having no electric railways, could be admirably served by omnibus for the time being. If people desired or demanded omnibus transport, he said, "our companies should be the ones to furnish it, because we are primarily in the transportation business."

London Underground Railways.

The annual meetings of the Underground Electric Railways Company and its associated companies, which have been held recently, were particularly encouraging. All-round increases in net revenue were reported, and in most cases higher dividends than usual were declared. In some cases the dividends were the highest on record. Perhaps the most noticeable announcement was the declaration of a dividend of 1 per cent. on the ordinary stock of the Metropolitan District Railway. During the whole existence of the District Railway Company this stock has received a dividend on only five previous occasions, the highest rate being $1\frac{1}{8}$ per cent. in 1880. The last distribution—and it was only fractional—was in 1882. Lord Ashfield, the chairman of the company, told the shareholders that the dividend was practically paid out of the proceeds of the second half of 1921, the distribution of the common fund of the associated companies having been revised as from July 1 of last year. It may be asserted, however, that the increased prosperity of all the companies had its share in the result. As to the causes of the improved position of all the companies, they may be summarised in the phrase higher fares and decreased working expenses. The latter are due to falling wages. The lower cost of materials has not yet had time to produce much effect, owing to stocks bought at higher prices not being yet exhausted. It should be noticed that the improved position has come about in spite of a considerable decrease in the number of passengers. That falling off is not attributed to the higher fares—these fares are still lower than those on British railways generally—but to the great trade depression. The prospects for the current year are very fair; if and when trade begins really to revive they should be good. The chairman has since given some indications of the nature of his new proposals to the Government for improving the railways. The result of that application will, it is understood, be satisfactory, and it will lead to the employment of twenty thousand men over a period of two years. The Government are expected to guarantee interest and principal to the extent of £5,000,000 and to allow the companies to pay interest during construction of new tunnels.

CORRESPONDENCE.

RAIL CORRUGATION.

To the Editor of "THE TRAMWAY AND RAILWAY WORLD."

Sir,—Mr. Harvey's letter in your February issue deals with a subject in which I am more than usually interested. I agree with his remarks in reference to the report of the M.T.A. Committee on Rail Corrugation, but differ with him when he suggests that the "root cause" of corrugation is inherent in the rail. Such a theory would not cover by any means the vagaries of the trouble, and it has, I believe, been investigated in the past with negative results.

When the question is finally settled I think that the cause put forward by me in an article you were good enough to publish in your issue for August 1918, will be found to be correct. This is based on a piratic law of friction, namely, that the coefficient between the wheel and the rail varies with the vibration of the rail.

Briefly explained my argument is that where the rail is held to the foundation in such a manner that its rigidity along its length is not constant, and the natural vibration of the rail thus rendered uneven, then the biting force between the rail and wheel is a varying factor. The momentum of the wheels prevent any variation in the speed, but the tendency for them to bite better and then to skid would be there, and my contention is that this is manifested in the corrugation, the pitch length being a function of the diameter of the wheel.

In practice the variation in the rigidity of the rail may be brought about in different ways; for instance, where the packing under the rail is not uniformly firm, or where the paving varies in its tightness against the rail. But the most acute variation occurs, and also the most quickly developed corrugation, on modern track where the rails are held rigidly to transverse metal sleepers every seven or eight feet, and the joints anchored to girder sole plates. On the other hand, where the rails are laid in such a manner that the resiliency of the bed is uniform, and the natural vibration of the rail thus uninterrupted, corrugation does not occur. The greatest example of this is on our railways, where the trouble is practically absent.

Since the article I refer to was written, to take the matter a little beyond the purely theoretical stage,

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I carried out experiments on a model circular track 4 feet in diameter with rails made from $\frac{7}{8} \times 3\text{-}16$ in. mild steel, bright drawn. The foundation was of concrete, and in the centre a $\frac{3}{4}$ H.P. motor was mounted on a turntable. A horizontal shaft extended to the rail and carried a 6-in. case-hardened wheel, the speed of the motor being reduced by gearing. In the first experiment the rails were put down so as to get a sharp variation in their ridigity, being clamped every 7 inches to bolts let into the concrete, and every second joint resting on a solid bed, the remainder of the rail being quite free. The machine was kept running for three weeks, and in the course of the first few days corrugation began to develop at exactly the points anticipated and these gradually extended until a good part of the surface was covered, the pitch length of the corrugation being approximately 3-16 in. In the second experiment rails were used from the same bars of mild steel, but instead of being clamped to the concrete bed wood blocks were interposed between, and the resiliency of the bed made as uniform as possible. The machine was kept running for fully six weeks, but no corrugation developed. This, I think, is proof that there is something in the theory advanced. If these corrugated rails would interest you I would be pleased to forward them for your inspection.

Yours, etc.

Birmingham. H. M. DUDGEON.

To the Editor of "THE TRAMWAY AND RAILWAY WORLD."

Sir,—I am not writing to criticise Mr. Harvey's letter which appeared in your February issue, but I feel with regard to this subject that the more experience I have with it the less inclined I am to dogmatise.

I am writing, however, to call attention to a very interesting theory brought forward by Mr. Dudgeon in an article published in the August, 1918, number of THE TRAMWAY AND RAILWAY WORLD.

It seems to me that this article did not receive the attention it deserved. Mr. Dudgeon's statement was as follows—

(1) The adhesive force of the rail varies at different parts of the surface owing to the interruption and reflection of the vibration. Where this variation is very acute, and the momentum of the wheel is too great to allow the velocity to adjust itself to it, the surface of the rail is eroded unevenly and the result is corrugation.

(2) If a wheel rolling on a rail for any reason wanted to bite better or to slip, and it had any choice, it would do so at the points of least resistance. A variation in the adhesive force of the rail, due to the interruption and reflection of the vibration in it, would set up such points, and result in corrugations.

I take it that Mr. Dudgeon will agree that the variation in the coefficient of friction from any cause would produce similar results to a variation caused by the interruption and reflection of rail vibration. I have come across nothing in practice to refute Mr. Dudgeon's theory, and, what is more, all cases of corrugation I have met with tend to show the theory to be a correct one. The following are a few instances—

(1) A track laid in 1901 has corrugations scrubbed out many times with increasing periods between the scrubbings. Last scrubbed in 1915, and only now reappearing very slightly.

(2) The type of wheel changed from chilled iron to steel tyred. Corrugations appearing less quickly with a tyre having a better coefficient of friction.

(3) On a track laid without anchors, slight corrugations have been known to appear soon after construction, and when scrubbed out these corrugations have not reappeared.

(4) I believe there is a tendency for high tensile steel rails with a less stable web and greater "whippyness" to corrugate before ordinary Bessemer rails.

I have no doubt that your readers could bring forward many actual and peculiar instances of corrugation, which would be very useful data to tabulate in connection with this important and expensive disease.

Yours faithfully,

C. OWEN SILVERS.

Wolverhampton Corporation Tramways
Cleveland Road,
Wolverhampton, March 3, 1922.

To the Editor of "THE TRAMWAY AND RAILWAY WORLD."

Sir,—I read with interest the letters from Mr. Harvey, of Ilford Tramways Department. I am very humble, and like to take a back seat on rail corrugation discussions, but I feel compelled to give an experience which may astonish many people.

Last summer we were putting in an extra loop on a single line 2 furlongs 5 chains from a terminus. We bonded across the break, and kept a *new* car on the terminus side. Owing to bad weather the construction of the loop was delayed, and the same car was therefore running up and down from terminus to the break for several weeks.

All I wish to point out is the indisputable fact that a large portion of this quarter-mile of track was *very badly* corrugated when the single car (which had been newly delivered from the maker's works) started to run. Before the loop was completed, however, *not a sign of corrugation could be observed* on this short length of track!

Yours faithfully,

A. J. ABRAHAM,
General Manager.

Aberdare Urban District Council,
Electricity and Tramways Department,
Aberdare, February 25, 1922.

FORTHCOMING TRAMWAY CONGRESSES.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

Particulars are given in the Journal of the Tramways and Light Railways Association for February of the arrangements for the annual congress of the Association, which will be held at Bournemouth. The date has now been fixed for Thursday and Friday, June 22 and 23. Papers to be read include one on "Bournemouth Corporation Tramways," by Mr. I. Bulfin, general manager; "Railless Traction," by Mr. E. M. Munro; and "Modern Improvements in Tramway Rolling Stock," by Mr. C. J. Spencer.

As this is the first congress to be held under pre-war conditions since the congress at Newcastle in July 1914, it is anticipated there will be a large attendance. The Mayor of Bournemouth and the Tramways Committee, who have invited the Association to hold their congress at Bournemouth, have placed a suitable hall at their disposal for the business meetings, either at the Town Hall or at the Municipal College. The Mayor and Corporation will entertain the members at luncheon on either Thursday or Friday, and the Association's annual dinner will be held on the other evening.

MUNICIPAL TRAMWAYS ASSOCIATION.

The summer meeting of the Managers' Section will be held at Glasgow on Thursday, June 15, and Friday, June 16. The annual conference will be held at Newcastle-on-Tyne on September 13, 14 and 15.

Tramway System for Peking.—The *Times of India* of February 10 says it is expected that the new Peking Tramways Company will begin the construction of its track "early next spring," entirely with Chinese capital. The Peking municipality and the company have come to the conclusion it is unnecessary to order the demolition of the whole city wall. Only a certain portion of the inner city wall will be demolished. The capital of four million dollars has been fully subscribed by the Government and the Chinese Bankers' Association.

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NEW TRAMWAY AGREEMENT.

FULL TERMS DECIDED BY JOINT INDUSTRIAL COUNCIL.

An important revision of the Tramway Agreement of March, 1919, was effected at an adjourned meeting of the National Joint Industrial Council for the Tramway Industry, held at Montagu House, London, S.W., on Thursday, March 9. The official "record of proceedings," which we publish below, recalls briefly at the outset that at the previous special meeting of the Council held on Friday, March 3, proposals submitted by the employers' representatives for a new Agreement were considered. After sitting from 11 a.m. to 5.30 p.m., the meeting was adjourned until March 9.

RECORD OF PROCEEDINGS OF ADJOURNED SPECIAL MEETING OF THE COUNCIL ON MARCH 9, 1922.

Alderman Wylie presided and those present were—

Sir John Timpson, K.B.E., Aldermen Brown, Craddock, Higham, Messrs. Baker, Bond, Edwardes, England, Fearnley, Goodyer, Rossdale, Spencer, Stokes, Verdon-Smith, Young, and Tegetmeir.

Messrs. Bevin, Black, Baggott, Brown, Clay, Clode, Dunnicliffe, Friend, Ford, Freeman, Graham, Kerr, King, Kershaw, Skinner, Sugden, Tilling, and Trustrum.

Messrs. J. Beckett, J. Cliff, and A de Turckheim (joint secretaries); Mr. Chapman (Ministry of Labour).

Messages of regret for non-attendance were received from Messrs. Howley, McLean, and Bradwell.

The Council resumed consideration of the Draft Agreement, and after the remaining points at issue had been discussed, it was unanimously resolved—

"That the revision of the Agreement of March, 1919 (set forth herewith) be adopted, subject to the approval of the constituent employers and employees."

AGREEMENT MADE BETWEEN THE REPRESENTATIVES OF THE EMPLOYERS AND EMPLOYEES ON THE NATIONAL JOINT INDUSTRIAL COUNCIL FOR THE TRAMWAY INDUSTRY, TO REGULATE THE HOURS OF LABOUR AND CONDITIONS OF SERVICE OF THE EMPLOYEES ON THE OPERATING AND MAINTENANCE STAFFS IN THE TRAMWAY INDUSTRY.

CLAUSE 1.—HOURS OF WORK.

(*a*) The Average Duties Schedule shall be 48 hours per week of six days, including signing on and signing off, over such period as may be agreed locally, subject to the period not exceeding a maximum of three months.

No schedule of weekly duty shall be less than 44 hours, nor more than 52 hours. No schedule of daily duty shall be less than six hours, nor more than ten hours.

(*b*) Duty Schedules shall be posted, on which the Rest Days shall be shown, and not less than six days' notice shall be given of variations of such schedules to meet special occasions.

(*c*) That the question of spread-over time be left to each undertaking to confer with the representatives of the Trade Union with a view to reducing the same to the lowest possible minimum.

CLAUSE 2.—GUARANTEE.

(*a*) All employees entitled at this date to a guaranteed 48 hour week shall retain such guarantee, provided—

(1) That the employee has presented himself for work at the appointed time on each day.

(2) That the employers shall be at liberty to allot to any employee for whom work cannot be found at his regular occupation, such other work as may be considered suitable by the management, subject to such work being only of a temporary character.

(3) That in the event of a stoppage in the tramway service, whether complete or partial, from causes beyond the control of the tramway authorities, such as stoppage due to disputes, serious breakdown of machinery, or short time in local industry, the guaranteed week shall be suspended, and only the actual time worked shall be paid for.

(4) In the event of any dispute of Clause 2*a*, sub-section (3), such dispute shall be referred to the National Council for settlement.

(5) In the event of a partial stoppage, the tramway authority shall consult the local representatives with a view to enabling the work to be divided equitably amongst the employees.

(*b*) (1) The total number of new entrants into the service who are not to receive a guaranteed week of 48 hours shall in no case exceed a maximum of 10 per cent. of the total number employed; and these shall be guaranteed a week of not less than 32 hours, to be completed within six days.

Note.—The precentage of the men required within the limits of the 10 per cent. shall be, in the first instance, the subject of local negotiation, it being understood that failing agreement, the determination shall rest with the management.

(2) In the event of a man being called out he shall be paid a minimum of four hours for the first call, and two hours for each succeeding call in the day.

CLAUSE 3.—OVERTIME.

(*a*) An employee working in excess of his scheduled duty on the rota of duties of a service or route, shall be paid at the rate of time and a quarter for the first two hours, and time and a half after.

(*b*) In the event of an employee working voluntarily at the request of the management on his "Rest Day" he shall be paid a rate of 25 per cent. in excess of the rate prevailing on that day, but such time worked shall not count for weekly overtime.

CLAUSE 4.—HOLIDAYS.

(*a*) Employees shall be entitled to eight days' holiday annually with pay, after 12 months' continuous service. Holidays shall be taken by the employees at such time of the year as may be agreed locally.

(*b*) In respect of the four National Holidays, viz., Easter Monday, Whit Monday, August Bank Holiday, and Boxing Day, and any National Festival, time and a quarter rates shall be paid, except in districts where such holidays are not recognised, when ordinary rates shall be paid, and four other holidays shall be substituted.

(*c*) Christmas Day shall be worked, when required, and double ordinary week-day rates shall be paid for the time actually worked, with a minimum of four hours' work. Local consideration shall be given to the working hours of the Schedule on that day.

(*d*) In respect of Sundays, time and a quarter rates shall be paid.

(*e*) Employees who voluntarily leave the service, or who are dismissed for misconduct, shall not be entitled to any allowance in lieu of holidays.

(*f*) In calculating holidays for the purpose of payment, "Rest Days" shall not be included.

(*g*) No employee shall be entitled to payment in lieu of holidays.

CLAUSE 5.

Added rates of pay shall not be taken into calculation for the purpose of making up the guarantee.

CLAUSE 6.

Clauses 1 (*b*), 3 (*a*) and (*b*), 4 (*b*), (*c*) and (*d*) may be modified by agreement between the management and the Trade Union representatives in the case of small undertakings, or undertakings where the traffic, owing to seasonal or other causes, is of a special character.

CLAUSE 7.

(*a*) The working week of the Depot Day Staff employees shall be 47 hours.

(*b*) The working week of the Depot Night Staff employees shall be 48 hours, such hours to include a meal-time allowance of not less than 30 minutes each night.

CLAUSE 8.

Permanent Way employees, and employees whose wages, overtime rates, and conditions of service may be regulated by those of other industries, shall be excluded from the provisions of this Agreement. Pending negotiations for a new Agreement in respect of permanent way employees whose conditions of service are governed by the Agreement of March, 1919, that Agreement shall continue in force until May 1, 1922.

CLAUSE 9.

Any privileges or emoluments or conditions of service enjoyed under Clause 10 of the Agreement of March, 1919, may be discontinued six months after this Agreement comes into force, provided that the employees have not come to a local agreement, nor satisfied a committee of the National Council that they are entitled to the continuance of such privileges or emoluments or conditions of service, and failing agreement by such committee, an independent person shall be appointed with power to modify or decide. An employer shall give reasonable notice to the employees of the privileges, emoluments, or conditions of service which they desire to discontinue.

CLAUSE 10.

The terms of this Agreement shall operate as and from the commencement of the first full pay period after April 17, 1922, and shall be terminable upon three months' notice from either side.

CLAUSE 11.

Any dispute arising as to any portion of this Agreement, shall be referred to the National Joint Industrial Council for settlement.

(Signed) J. BECKETT, J. CLIFF, A. DE TURCKHEIM — *Joint Secretaries.*

Ministry of Labour,
March, 1922.

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LONDON UNDERGROUND GROUP.

ANNUAL MEETINGS OF RAILWAY AND OMNIBUS COMPANIES.

The annual meetings of the companies included in the London Underground "Common Fund Group" were held in the Caxton Hall, Westminster, on February 23, Lord Ashfield, the chairman of the directors, presiding. The companies concerned (a summary of whose reports is given in another column) were as follows—The Metropolitan District Railway, London Electric Railway, Central London Railway, City and South London Railway, and the London General Omnibus Company.

Metropolitan District Railway.

Addressing the shareholders of this company, Lord Ashfield referred to the efforts which had been made to secure the co-ordination of all the traffic facilities in London. After mentioning that the conference between the Underground Group and the London County Council on this matter had had to be abandoned, he said that the question was reopened once again by the appointment of the present Royal Commission on London Government, presided over by Lord Ullswater. "Your company, in concert with its associates," Lord Ashfield proceeded, "is giving careful consideration to the evidence to be submitted to the Commission at a later date, and here, perhaps, I may again affirm the principles upon which our action has been governed in the past. We do not object to an adequate and safeguarded measure of public control by an independent body. We believe that will tend to good results, but to ensure them we think that with control should also go a measure of protection. In fact without protection against unfair and quite unnecessary disturbance there is no means of securing control. The one is a natural consequence of the other. While agreeing with public control, we believe that only by private enterprise can the operation of London's transport facilities be carried out successfully." They could only hope that the report and recommendations of the Royal Commission would render any necessary legislation possible in an atmosphere which would be conducive to a fair and equitable settlement.

Dealing with the traffic results of the past year, Lord Ashfield alluded to the disastrous effects of the coal strike and the subsequent trade depression, but for which, he said, the expectations of the group of companies would have been reached. "Certainly we were right in so far as the revised level of fares was concerned. Taking the four railway companies together, the passengers carried in 1921 amounted to 339,000,000 in round figures, or 65,000,000 less than in 1920, equivalent to a decline of 16 per cent. No fewer than 21,000,000 of these lost passengers were workmen, representing in their case a decline of 28 per cent., and indicating only too clearly the stagnation of trade and industry. Taking the passengers carried by both railways and omnibuses in the common fund group the total number for the year 1921 is 1,100,000,000, or 72,000,000 fewer than in the previous year, from which you will observe that the falling off in omnibus passengers is under 7,000,000, or less than 1 per cent."

Lord Ashfield dealt at length with the scheme put before the Government last autumn for various extensions of the present railway system, approval of which was declined. He said that a revised scheme had been submitted to the Special Committee appointed by the Government, which, he hoped, would be acceptable. With the provision last year of additional rolling stock, the car sheds and shops were inadequate, and advantage was taken of the opportunity to provide accommodation for overhaul and maintenance of the rolling stock of all the associated railway companies in a single centralised establishment with its resultant economies. A site had therefore been acquired adjacent to the Acton Town Station, upon which a commencement had been made in the erection of a new central works. The total amount which it was expected would be spent in the next two years upon these works was £176,000, making a total expenditure of about £350,000.

London Electric Railway.

In the course of his speech at the meeting of this company, Lord Ashfield referred to the new experimental train with air-worked doors on the Piccadilly section. Alterations to rolling stock were in progress to provide ten trains of this type. The convenience of passengers and the speed of operation were increased by the additional and wider doors, and there was a reduction in the number of men required per train. He also alluded to the new type of booking office constructed and worked with considerable success at Kilburn Park Station (described in our issue of January 19, 1922), and said the experiment was being extended to several other stations. The ratio of working expenses to receipts on the railways during 1921 was 70 per cent. This was much too high for remunerative operation, but there was a lively hope of its being reduced to a more normal proportion, even though they could not expect to reach the 50 per cent. of the year immediately before the war.

Central London Railway.

Lord Ashfield pointed out that the year 1921 was the first during which the extension railway from Shepherd's Bush to Ealing had been continually worked. Under the agreement with the Great Western Railway Company that company maintained the railway and stations and the Central London Company worked the train service, receiving a share of the traffic receipts attributable to the extension railway. He regretted that this share of the traffic receipts had barely been sufficient to meet the expenses incurred during last year. This was due to the higher fares charged upon this route, necessitated by the fact that the railway from Shepherd's Bush to Ealing Broadway was a part of the Great Western Railway. Progress was being continued with the transfer of the power supply from the generating station at Wood Lane to the Lots Road power-house, and further expenditure amounting to £11,900 was shown in the accounts contemplated in this connection. The last steam locomotive belonging to the company had now been removed from the active list. There had been a decline in passengers, the number carried falling approximately from 50 millions to 43½ millions, or by 13 per cent.

City and South London Railway.

Reference was made by Lord Ashfield to the need for more modern equipment and enlarged tunnels on this railway. He added that the management had joined with the London Electric Railway Company in putting forward an application to the Government for a grant of sufficient money to enable this reconstruction to be carried out. Traffic had declined by more than 9,300,000 passengers during the year, representing a drop of 23 per cent. The decline was the most severe upon this railway than upon any of the railways in the group. They hoped therefore that they would receive a favourable answer from the Government, and that they would be enabled to proceed with the work during the present year.

London General Omnibus Company.

Lord Ashfield said considerable progress had been made in the replacement of the pre-war type of omnibus by larger omnibuses of modern and improved design. By the close of the year 926 "K" type omnibuses, each seating 46 passengers, and 205 "S" type omnibuses, each seating 54 passengers, were brought into service by the L.G.O.C. alone, and similar steps to reinstatement had been taken by the allied motor omnibus companies. The experience obtained of the working of the "S" type omnibus had been good, and the company felt justified in proceeding with orders for further substantial numbers, which it was expected would be added to the fleet during the first half of the current year. After alluding to the opening of the new Central Overhaul Works at Chiswick, (which were fully described in our issue of February 16, 1922), the chairman said that with the purchase of the additional omnibuses it would be necessary to provide further garage accommodation. It was therefore proposed to enlarge the garage at Forest Gate and to build a garage at Barking. It was further intended to build a small garage to the north of Walthamstow in relief of Leyton, and others at Dunton Green, near Sevenoaks, Hatfield, and in the Guildford area. The miles of roads occupied had increased from 568 at the commencement of the year to 685 at the close of the year, or by 117 miles. The L.G.O.C., who hitherto worked and maintained under agreement the motor omnibuses of the Gearless Motor Omnibus Company and the Tramways (M.E.T.) Omnibus Company, had now taken steps to acquire, as from January 1, 1922, the shares and undertakings of these companies, so that there might be a further consolidation of interests. To summarise the principal feature of the year 1921, it had been a resumption of progress interrupted by the war, and the development of omnibus services to provide satisfactorily and fully for the whole of the Greater London area.

The number of passengers carried was 761,250,000, or 6,700,000 less than in the previous year. There seemed to be a general lack of money, which restricted the number of rides taken by the population, and until there was a restoration of prosperity among the inhabitants, he was afraid they could not look forward to an expanding traffic. The revised fares brought into effect on September 26, 1920, continued in force until December 1, 1921. These met, as was expected, the financial requirements of the companies, and served to put transport on a reasonably remunerative basis. Lord Ashfield alluded to the reduction of fares made by the London County Council on December 1, 1921, which was followed by a corresponding reduction on the part of the omnibus companies. Proceeding, he said that the mileage worked by omnibuses had increased from about 86 millions to 87 millions of miles, or by just over 1 per cent. On the question of accidents, he pointed out that the record of the companies during last year had been better than it had ever been in the history of the companies.

Referring to their attempts to co-operate with the London County Council in providing motor omnibus services, Lord Ashfield said that the loss on the working to meet the requirements of the London

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County Council had amounted to £22,000 in the course of the year. Through tickets between the Council's tramways and the omnibuses were issued at various points, but the number of these tickets sold in the year was only 260,000. They represented a very small proportion of the exchanging traffic, and it hardly seemed to merit the special facilities which had been offered.

UNDERGROUND ANNUAL GROUP REPORTS FOR 1921.

METROPOLITAN DISTRICT RAILWAY.—In consequence of the Government control of the company's railway during 1920, certain figures for that year are not comparable with those for 1921, and are omitted. The net receipts for 1921 show an improvement of £164,041, but as miscellaneous net receipts are smaller by £41,328, the gain in total net income is limited to £122,713. After deducting fixed charges, which show the small decrease of £611, and placing £65,000 to reserve, against £45,000 only last year, the available balance, including the amount brought in from 1920, is £291,330, an increase of £101,763. The full dividend of 5 per cent. is paid on the second preference stock, against only 3 per cent. for 1920, and the ordinary stock receives 1 per cent., the first distribution on that stock since 3-16 per cent. was paid for 1882.

LONDON ELECTRIC RAILWAY.—There is an increase in receipts of £223,091 at £2,040,010, but expenses are down £18,523 at £1,368,771. Net receipts are therefore up £241,614 at £671,239. Miscellaneous net receipts were £136,804, and the balance from last account £22,350. After deducting £295,544 for interest and rentals and £65,000 for reserve and meeting preference dividend, there is enough to pay 3¼ per cent. on the ordinary, and carry forward £39,744. Capital expenditure came to £135,905.

CENTRAL LONDON RAILWAY.—Total receipts aggregate £661,479, an increase of £83,096, but expenditure was reduced by £16,704 to £468,428. Net receipts are up £99,800 at £193,051, and miscellaneous receipts come to £68,071. The balance from last year was £15,161. Interest and rentals absorb £46,039, and £29,000 is placed to reserve, an increase of £9,000. The preference dividend absorbs £21,600, and 4 per cent. is paid on the ordinary and preferred ordinary stocks, leaving £59,644 to be carried forward. The capital expenditure came to £8,185.

CITY AND SOUTH LONDON RAILWAY.—With an increase in receipts of £19,008, and a decline in expenses of £20,470, the net receipts show a gain of £39,478 to £145,558. Miscellaneous net receipts are also up £2,000, and as fixed charges are down £2,208, the available amount, including the slightly smaller balance brought in, shows an increase of £43,356 at £151,876. The sum of £36,000, or £11,000 more than last year, is placed to reserve. The consolidated ordinary dividend is raised from 1½ per cent. to 3¼ per cent., and the "carry forward" from £18,820 to £25,276.

LONDON GENERAL OMNIBUS.—An expansion of £566,241 is shown in receipts to £7,500,572, but an increase of expenditure of £260,844 at £6,936,082. Miscellaneous receipts came to £183,552. Interest and rentals reached £152,474, and £335,000 was appropriated to reserve, an increase of £50,000. The dividend is 8 per cent., free of tax, against 5 per cent., free of tax, and £67,928 is carried forward, against £58,843 a year ago. The expenditure on capital account was £664,402. The company now works 685 road miles.

ELECTICITY (SUPPLY) BILL.

The second reading of this Bill was passed in the House of Lords on March 8. The Earl of Bessborough urged that there should be some time limit to the amount which local authorities should be permitted to borrow for the purpose of the joint electricity undertakings. Viscount Haldane contended that there was a tremendous case for the Bill, particularly in relation to the conservation of the national coal supplies. Small generating stations were always wasteful. In London there were 70 generating stations, 50 different systems of supply, 24 different voltages, and 10 different frequencies. How could they be efficient in that way? There were 600 generating stations in the country, and their output was ridiculous when compared with modern standards. Opposition to the Bill was, he said, epitomised in a newspaper headline, "Flank attack on private enterprise." Lord Buckmaster objected to placing the exercise of expert powers in inexpert hands. With the best will in the world, local authorities could make the most profound mistakes. The Marquis of Salisbury said the moment was inopportune for placing a still further burden on local rates. Lord Gainford urged that private enterprise should be given a freer hand rather than that the community should be subjected to increased rates and taxation. On a division the motion for a second reading was carried by 59 to 40.

LONDON "SAFETY FIRST" COUNCIL.

ANNUAL MEETING AND PRIZE DISTRIBUTION.

The annual meeting of the London "Safety First" Council was held at the Mansion House on February 22, under the presidency of the Lord Mayor. A large attendance included many omnibus, tramcar, and other vehicle drivers, to whom the slogans of the movement are so familiar and useful. The annual report contained a review of the Council's activities during the five years of its existence. After an allusion to the success of last year's "Safety First" essay competitions for school children and children of railway employees, the report stated that the "Freedom from Accidents" competition for drivers had grown in popularity and the number of entrants had advanced to nearly 7,000. The possession of the Council's badge is keenly sought and, when obtained, is greatly valued. There could be no doubt that the successful operation of these two competitions contributed materially to the diminution of fatal street accidents which, during the nine months ended September 30 last, declined by about 17 per cent.

LEFT-HAND RULE OF THE FOOTPATH.

After nearly five years persistent advocacy of a left-hand rule of the footpath, substantial advance had been made in that, following endorsement by the principal municipal associations and by the Advisory Committee on London Traffic, the Minister of Transport stated he would have no objection to the Council recommending municipalities to exhibit notices "Keep to the left of the footpath." A communication had been addressed by the Ministry to the Municipal Corporations' Association, the County Councils' Association, the Urban District Councils' Association and the Rural District Councils' Association, drawing attention to a resolution of the Roads Advisory Committee to the effect that it considers "it desirable that footpath traffic and vehicular traffic should conform to the same rule, and that steps should be taken to enlist the co-operation of local authorities in the matter, also asking that the subject might be placed on the agenda for the consideration of each association, so that the views of their members may be ascertained upon the expediency of concerted action being undertaken by all local authorities in the introduction of the new practice." In the Greater London area, the London County Council, 24 borough councils and 31 urban district councils had pronounced in favour of the suggested regulation. In the interests of public safety the Council reaffirmed to the Ministry of Transport its opinion that the regulation respecting rear lights should be reimposed.

Particular consideration had been given to the important subject of the rectification of dangerous corners, street refuges, and certain other features which might constitute a danger to traffic. A majority of the railway companies operating in the London area actively supported the Council and had granted valuable space for the display of bulletins. Of a total of 18 Meritorious Service Awards granted by the Council, five had gone to railway servants for conspicuous gallantry in preventing accidents.

The report concluded with an appeal for greater support. The Council fully recognise that there is an ever-widening scope for its activities, and that there is need for greater educational publicity, increased propaganda, and more intensive effort. These, however, involve the expenditure of money, it is pointed out, and lack of funds stifles progress and expansion.

TRIBUTES TO COUNCIL'S WORK.

The Lord Mayor congratulated the Council on the useful work it had done in the five years it had been in existence, and said the record was all the more remarkable when one considered the small expenditure with which it had been effected.

Sir Henry Maybury (Director-General of Roads, Ministry of Transport), moving the adoption of the report, referred to the decrease in the number of street accidents since 1914, notwithstanding the large increase in the number of vehicles. This was largely due to the operations of the "Safety First" movement. About 90 per cent. of all street accidents could be avoided. The public needed educating, and the "Safety First" Council was doing a great work. Mr. H. E. Blain seconded, and read a letter from the Duke of York regretting his inability to attend, and expressing the hope that the society would continue to flourish.

The Duke of York was unanimously re-elected president of the Council, and the following were elected vice-presidents—Lord Leverhulme, Sir Alfred Mond (Minister of Health), the Lord Mayor, Sir William Joynson-Hicks, M.P., and Sir Henry Maybury.

The Lord Mayor then presented the 90 awards in the "Freedom from Accidents" competition, and the awards for stopping runaway horses.

In November, the offices of the Council were transferred to 15, Savoy Street, Victoria Embankment, W.C.2, where better accommodation for meetings has been secured.

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L.C.C. AND LONDON UNITED TRAMWAYS.

THROUGH RUNNING AGREEMENT.

At the meeting of the London County Council on February 28 the Highways Committee reported that the Council on January 31, 1922, decided to serve on the London United Tramways notice of its intention to complete the purchase of the company's undertaking in London on May 2, 1922. Under the agreement with the company dated December 6, 1917, if the company are not required to work exclusively the lines purchased, the Council is at liberty to run over the company's lines in Middlesex jointly with the company, and the company are at liberty to run jointly with the Council over the lines purchased, the mileage being equal and each party accounting for gross receipts taken, the other terms and conditions being agreed or determined by arbitration; further, each party is to have the right to fix and alter fares on its own tramways. The Highways Committee have been in communication with the company as to the through running arrangements after the transfer of the lines, and as a result it is proposed that instead of the provisions of the agreement as to running being carried into effect at the time of transfer, those provisions shall remain in abeyance while the arrangement referred to below is in force. The Highways Committee therefore recommended that an agreement be entered into with the London United Tramways to provide that, for a period of three years and thereafter until determined by either party by six months' previous notice—

(i.) The company shall continue to operate the lines transferred to the Council in Hammersmith; (ii.) the Council shall run one service from Hammersmith to the county boundary and thence along the company's lines to Kew Bridge or such other point on the company's system as may be agreed; (iii.) the Council shall operate the whole of the service on the company's lines between the county boundary at Merton and Wimbledon; (iv.) each party shall retain the receipts from its own cars; (v.) the company shall fix the fares on the transferred Hammersmith lines subject to their not increasing the fares beyond the rates at present in force; and (vi.) the Council shall fix the fares on the route from the county boundary at Merton to Wimbledon, and that the Highways Committee settle the other terms and conditions of the agreement.

In connection with the taking over by the Council of the portion of the London United Tramways in London it will be necessary, in order to provide the proposed through services to Wimbledon via Merton, for a change-over point to be installed in the tracks at the present Merton terminus, for the overhead poles and wires to be extended, and for a physical connection of the tracks to be made. The works will be carried out under the provisions of Section 12 of the London County Council (Tramways and Improvements) Act 1901, and the Wandsworth Metropolitan Borough Council has been asked to consent to the proposal, as required by the Act. The cost of the work is estimated at £1,550. The company will meet half the interest and sinking fund charges.

THE MINISTRY OF TRANSPORT.

Time to be taken to Consider its Future.

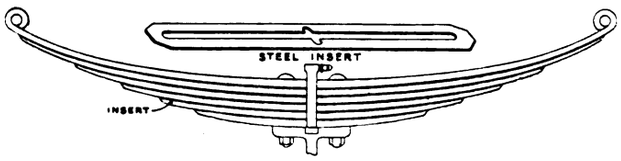
In the House of Commons on March 1, the Chancellor of the Exchequer made a statement of the Government's action with regard to the report of the Geddes Committee. The revised estimate for the Ministry of Transport for the year beginning in April next was, he said, £243,000, but since then the department had brought the estimate down to £211,000. The Geddes Committee recommended that the Ministry should be transferred to the Board of Trade. That might be ultimately the right thing to do, but there were many things which the Ministry still had to wind up, and which by statute could only be done by the Ministry. There was a Minister of Transport, but he was doing his work gratuitously, and there would be no saving in a transfer to the Board of Trade at present, except what was involved in the salary of the Under Secretary. If it were quite certain that the Board of Trade was the best home for whatever Ministry conducted the operations of transport, they might resolve now that the transfer should take place. There were, however, things which could not suitably be dealt with by the Board of Trade at all—roads, for example. These would be better dealt with in the Ministry of Health, which treated with local authorities. The Government thought it would be better to take some time to consider the whole matter in connection with what they must consider soon—a large reorganisation of Government departments. There would be much to be said for uniting the Ministry of Transport with the Post Office, and having a Ministry of Communications. That had been strongly urged, and he only suggested it to show that there might be many points of view, and that it was better to get the right one than to act precipitately now.

LAMINATED SPRING LUBRICATOR.

A CENTRE-FED SYSTEM.

With the laminated type of spring in general use on most types of road and rail vehicles it is somewhat strange to find that more attention has not been paid to the question of efficient lubrication between the component metal leaves. A device which the manufacturers claim will ensure thorough and constant lubrication throughout a laminated spring is being introduced into the United Kingdom by the Anger Manufacturing and Supply Company, Limited, of Bank Chambers, Preston. "Centre-fed spring inserts" consist of strips of low carbon steel, ·025 in. thick, with a ¼-inch slot running down the centre. These are interposed between each lamina of the spring, so that the central slot extends to within one inch of either end. Oil is fed to each "insert" from a centre channel by means of a high-pressure gun.

By this method, the manufacturers point out, a distinct advantage is gained in that oil passes from within the spring outward, and not—as is commonly the case—from the outside of the leaves inward, carrying grit or other impurities with it. The lubricant reaches every part of the spring, and when a fresh supply is needed the old oil is cleaned out with paraffin forced through the leaves. By the use of the pressure oil-gun any grade of heavy engine oil may be driven into the spring within a period of from eight to ten minutes, after about every 500 miles running. The Anger Manufacturing Company assert that this treatment prolongs considerably the life of the springs, prevents breakage, precludes rust, and eliminates the tendency of the springs to creak. These qualities are reflected in an improvement of the tyre and petrol mileage; they lessen the depreciation of the car, and will cause any standard set



Centre-fed Spring Insert.

of springs to last as long as the car itself. Efficient spring lubrication in passenger vehicles may also, of course, be expected to enhance the comfort of riding.

We understand that the centre-fed spring inserts are being adopted by some of the largest motor vehicle manufacturers in the United States, and that the device is giving much satisfaction. On a recent test a car so equipped travelled 38,600 miles, after which the springs were examined. No wear of the inserts was apparent to the naked eye, nor could any wear be found on the leaves of the springs. Tests obtained from runs of from 5,000 to 40,000 miles have given equally gratifying results.

The Anger Manufacturing and Supply Company, Limited, are the sole concessionaires for the British Isles, and all foreign countries, and the spring inserts are patented throughout the world. Their manufacture is now to be carried on in the British Isles.

DYNAMOS AND THEIR ATTENDANTS.

The publication of the tenth edition of "Dynamo and Motor Attendants and their Machines," from the house of S. Rentell and Company Limited, 36, Maiden Lane, W.C., is in itself almost sufficient tribute to the popularity and usefulness of this book by Mr. Frank Broadbent, M.I.E.E. As a work of reference and a guide to motor mechanics and others concerned with electrical plant, the previous editions have won much popularity. The text has now been revised and enlarged to meet enquiries from readers, with the result that the impression now in our hands is thoroughly up to date and comprehensive. From the preface we learn that the main revisions concern "the permissible temperature limits of dynamos and motors, and the method of reversing induction motors. The sections on these subjects have been re-written, and two simple diagrams have been added to strengthen the written explanation of the principle of reversibility." Another section which has been amplified is the appendix describing the method of testing the polarity of the magnets of dynamos and motors. The book, neatly bound in cloth, is published at 4s. 6d. net.

A New Trolley Omnibus.—The Associated Equipment Company, of Walthamstow, has constructed a trolley omnibus which has been tried with very satisfactory results on several tramway routes in the London district, current being taken from the tramway overhead wires.

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FINANCIAL REPORTS AND MEETINGS.

PAISLEY DISTRICT TRAMWAYS COMPANY.—The profits for 1921 were £34,736. A dividend of 4 per cent. is proposed on the ordinary shares, carrying forward £8,932.

W. T. HENLEY'S TELEGRAPH WORKS COMPANY, LIMITED, have announced a final dividend on the ordinary shares of 2s. per share, less tax, making 3s. per share for the year, less tax.

NORTH METROPOLITAN ELECTRIC POWER SUPPLY COMPANY.—The issue of £250,000 8 per cent. cumulative second preference stock was subscribed for over 13 times by more than 3,000 applicants.

JERSEY RAILWAYS AND TRAMWAYS.—The gross receipts for 1921 were £22,506, and net receipts totalled £2,927, less interest on debentures, £1,035, leaving £1,892, plus £618 brought forward, making £2,511. The directors recommend a dividend of 5 per cent. on ordinary shares, carrying £811 forward.

WALLASEY'S HAPPY POSITION.—Wallasey Corporation Tramways (the general manager of which is Mr. R. R. Greene) are able to relieve the rates to the extent of £8,500, in spite of the fact that since April 1921, there has been a decrease of 3,023,137 in the number of passengers. A surplus of £18,000 had been anticipated, but owing to the heavy slump in traffic this was not realised. An increase in the price of fares, however, helped to right matters, and Wallasey was one of the five undertakings which last year paid their way. The omnibuses made a profit of £860, though a loss of £545 had been estimated. Penny fares were recently restored on the tramways.

YORKSHIRE (WEST RIDING) ELECTRIC TRAMWAYS COMPANY, LIMITED.—The report for the year ended December 31, 1921, shows that after providing for debenture interest there was a net profit of £33,071 13s. 9d. This has been appropriated as follows—Dividend at 6 per cent. per annum, less income-tax, on the 6 per cent. cumulative preference shares, £9,714; renewals, depreciation, and reserve fund in lieu of accident insurance, £19,126; carried forward, £4,230. The directors record with regret the death of their colleague, Mr. Benjamin Newgass. Mr. H. England, who has been general manager of the company since its inception, has been appointed a director to fill the vacancy.

SUNDERLAND DISTRICT TRAMWAYS, LIMITED.—At the annual meeting held in London, the chairman (Mr. H. R. Hogg) said the gross receipts for the year were £72,029, against £74,055 in the previous year. Running expenses were £55,511, against £53,784. This included £17,114 repairs and renewals. After deducting depreciation and the other usual items, the sum of £11,051 remained, against £16,187 last year. Adding the balance brought forward, and deducting the interest on the prior lien bonds and debentures, and the sinking fund instalment on the former, there remained £4,993. The board recommended a payment of the 5 per cent. interest on the income bonds, amounting to £4,065, and the carrying forward of the balance of £927, compared with £1,542 last year. This was agreed to.

LANARKSHIRE TRAMWAYS COMPANY.—The accounts for the year ended December 31 last show that the revenue amounted to £227,450 and the expenses £188,510, leaving a gross profit of £38,940, less contributions to local authorities, £2,009; interest on debentures, £640; interest account, £2,698; interest account—Lanark County Council Tramways, £621; and transferred to reserve for depreciation, £10,000; leaving a balance of £22,971, which with £1,131 brought in, totals £24,102. The directors recommend a dividend of 6½ per cent. per annum for the half-year ended December 31 last, making 5¾ per cent. for the year, placing £2,183 to revenue new account. The revenue shows a reduction of £2,096, due to the coal stoppage and severe trade depression last year. The expenses were reduced by £9,467 in spite of additional expenditure involved by the coal stoppage.

TYNESIDE TRAMWAYS AND TRAMROADS COMPANY.—The half-yearly meeting was held in Newcastle on February 14, Dr. J. T. Merz presiding. The chairman regretted that the dividends would be the smallest paid since 1912. As to the prospects of the company, it could be said that for the first six weeks of the present year business was about level with that of last year. On the whole, there was a slight indication of improvement. Dividends were sanctioned at the rate of 5 per cent. per annum on preference shares, and 2 per cent. per annum on ordinary shares (making, with the September dividend, 2½ per cent. for the whole year). The accounts for the half-year ended December last show a surplus of receipts over expenditure of £4,971, and £140 is brought forward. The reserve and depreciation fund is increased by £500, and £591 is carried forward.

LANCASHIRE UNITED TRAMWAYS, LIMITED.—The profit for 1921, less working expenses, general charges, and rent of leased lines, was £28,217. Receipts show a decrease of £14,881, and expenditure an increase of £7,754. Interest and dividends from operating company, plus motor coach and sundry receipts, was £69,761. Deducting motor coach and other expenses and interest on prior lien debenture stock, there remains a balance out of which interest at 2½ per cent., less tax, will be paid on second mortgage debenture stock for the year, leaving £1,126 for depreciation. The balance on working of operating company, after payment of interest and dividend, was £10,248. Depreciation and renewal account (after writing off £5,000 for depreciation on motor coaches and omnibuses) and amounts carried forward in combined companies now amount to £183,642.

LLANDUDNO AND COLWYN BAY ELECTRIC RAILWAY.—The report for the year ended November 30, 1921, shows that the profit amounted to £6,194, and, including £2,548 brought from the previous year, there is a total available balance of £8,742. For the redemption of debenture stock £2,040 is allocated, and the directors recommend the transfer to the reserve for repairs and renewals of £2,500 and the payment of a dividend of 4 per cent., less tax, requires £2,783, leaving £1,419 to be carried forward. The traffic receipts amounted to £38,035. During the early summer months the receipts were adversely affected by the restriction in the supply of electric current owing to the coal strike. Four new open type cars proved popular during the summer months. Increased fares were in operation for the whole of the year, and the receipts on the whole were satisfactory. The directors state that there are indications that the highest level of expenses is now passed.

FIFE TRAMWAY, LIGHT AND POWER COMPANY, LIMITED.—The annual meeting was held in Edinburgh, on February 24, Mr. William Low (the chairman) presiding. As in the case of the Power Company, he said, the receipts of the tramway undertakings had been affected by the coal strike and trade depression. Since the close of the accounts an issue of £250,000 7 per cent. debenture stock was made, which would enable the company to repay outstanding loans, and for the first time for some years have cash available for development purposes. The gross revenue from the company's properties amounted to £78,394, compared with £72,801 for the year 1920. The balance available after deducting debenture and loan interest, fees, etc., transfer of £17,000 to reserve, and allowing for the amount brought forward, was £41,037, out of which the full dividend on the preference shares for the year had been paid, leaving an undistributed balance of £30,117. After payment of a dividend on the ordinary shares at the rate of 8 per cent., £4,357 would be carried forward.

BRITISH COLUMBIA ELECTRIC RAILWAY COMPANY, LIMITED.—The annual report for the year ended June 30, 1921, which was presented at the general meeting held in London on February 14, shows that the net revenue, after providing for depreciation, sinking fund, renewals, etc., was £421,277, and that with the balance brought forward this amounted to £433,923. It was decided to pay the following dividends—Final dividend on the preferred ordinary shares at the rate of £1 3s. 8d. per cent. per annum, free of income-tax, making, with the dividend of £3 10s. per cent. paid in August last, £4 13s. 8d. per cent. free of income-tax a final dividend on the deferred ordinary shares at the rate of £2 14s. 2d. per cent. per annum free of income-tax, making with the dividend of £3 10s. per cent. paid in August last, £6 4s. 2d. per cent. free of tax. The amount carried forward was £24,000. Owing to the high cost of living, the company had to concede demands for increased wages in October, 1920, but since that time there has been a substantial fall in the cost of living, and an adjustment of wages in a downward direction is being made. On the other hand, the report states, taxation continues to increase.

PAISLEY DISTRICT TRAMWAYS COMPANY.—The annual meeting was held on February 22, Mr. Owen H. Smith presiding. The chairman said the traffic had increased in spite of the trade depression, but the expenditure had also increased. The general result was a profit of £34,736. After providing for general interest, income-tax, interest and sinking fund on debentures, the usual appropriation to general reserve, and providing the 5 per cent. dividend and sinking fund on the preference shares, they were able to recommend a dividend of 4 per cent. on the ordinary shares, and increase the amount carried forward from £6,545 to £8,032. The amount added to general reserve for the year was £12,139, to the sinking funds £5,754, and to the carry forward £1,487—in all £19,380—a very satisfactory total. The chairman referred to the suggested purchase of the undertaking by Glasgow Corporation, and replied to various criticisms which had been made of the company's system in the discussions on the matter. "Should they decide to offer us a price that we consider fair and reasonable," he remarked, "we shall hope to complete an agreement for sale. Should the negotiations not come to anything, no harm will have been done."

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TRAMWAY AND LIGHT RAILWAY NOTES.

BELFAST.

ROUTE EXTENSIONS—LOYAL EMPLOYEES.

At a meeting of the Tramways Committee on February 15, Councillor W. G. Turner presiding, it was decided to recommend the Council to promote a Bill in Parliament for the acquisition of additional lands and buildings contiguous to Bellevue Gardens (a pleasure resort maintained by the Tramways Committee). A scheme of tramway extensions was also discussed, and it was agreed that a special meeting should be held at an early date, and that the reports which were before the committee about 18 months ago on this subject should be re-submitted, with revised estimates. Councillor Turner has informed the City Council that he has received many expressions of appreciation of the loyalty of the motormen and conductors during the last 18 months under very trying circumstances. During the whole of that period not one member of the traffic staff refused to pass through the dangerous areas. The committee, recognising the strain placed on these men, decided, in response to an application from their trade union, to grant them four days' extra holiday this year.

BIRMINGHAM.

LATER CAR SERVICE.

The Tramways Committee decided to extend the hours during which the tramcar and omnibus services are run, so that the last cars will leave the city termini at 11.30 p.m., instead of 11 o'clock. The committee also decided to give a trial on the Harborne route to an omnibus of one of the latest London types.

BOLTON.

PRE-WAR FARES.

The Corporation Tramways Committee have decided that from Monday to Friday between the hours of 12 noon and 2 p.m. the ordinary pre-war fares shall be re-established. This has been confirmed by the Town Council. The same privilege had formerly been granted up to 9 a.m. and between the hours of 5 and 6.30 p.m., so that the pre-war fares from April 3 next will be as follows—Monday to Friday, up to 9 a.m., 12 noon to 2 p.m., and 5 p.m. to 6.30 p.m.; Saturday up to 9 a.m., and from 12 noon to 1.30 p.m. At all other times and on Saturday afternoons and Sundays, ½d. extra will be added to the fares on each route. The fares for children however, have never been increased and are still at pre-war level. Bolton was one of the last undertakings in the country to make any alteration in fares, the first revision being made in April, 1921.

BRADFORD.

TRACK CONSTRUCTION—TRAMCARS OR TROLLEY VEHICLES?

The Corporation Finance Advisory Sub-committee have approved the proposal that applications should be made for sanction to borrow £17,242 and £19,000 respectively for tramway track in Thornton Road, Listerhills, and the new road at School Green. At a recent Government inquiry into the Corporation's application for borrowing powers, the tramways manager (Mr. R. H. Wilkinson,) said that owing to the increased cost of tramway track construction, 75 per cent. of the lines would eventually have to be abandoned unless some form of transport cheaper than the tramway car was adopted. The city engineer stated that no ill effects had been noticed on the roads over which the Corporation were running railless trolley vehicles.

CARDIFF.

ROUTE EXTENSIONS.

The Tramways Committee have appointed a sub-committee to consider the question of tramway extensions in various parts of the city. It is not, however, intended to proceed with any extensions at present.

DOVER.

TRAMWAYS AND RAILLESS TRACTION.

The Tramways Committee have received reports from a deputation which they sent to inspect the railless trolley systems of York, Leeds and Bradford, with a view to a similar method of traction being adopted in certain parts of Dover. The general manager of the tramways (Mr. E. H. Bond) reported that the weight of evidence obtained was in favour of railless as "a sound, practical proposition." He estimated that the total cost of installing such a system in Dover, with three cars, would be £9,850, or with four cars, £12,300. The committee decided to defer consideration of the matter for two months, and in the meantime to carry out necessary repairs to the tramway track.

DUBLIN.

UNITED TRAMWAYS MEETING.

Speaking at the annual meeting of Dublin United Tramways Company, the chairman, the Rt. Hon. L. Waldron, said that by agreement with their employees the company had recently decided to reduce their wages by 4s. per week in two instalments of 2s. on February 1 and March 1 respectively. He added that the management thought the reduction should have been 5s., but in order to produce peace and goodwill they yielded to the lesser reduction. The chairman paid a tribute to the "great patience and courtesy" of the drivers and conductors, to the willing and able support accorded by the higher officials to the directorate, and to the loyalty of the whole staff throughout a very trying year.

EDINBURGH.

PRINCES STREET CONTROVERSY—ELECTRIFICATION PLANS.

A public inquiry is to be held in the city by the Ministry of Transport regarding the proposal of the Town Council to erect centre poles in Princes Street as part of the tramway electrification scheme. This statement was made by Mr. Arthur Neal, Parliamentary Secretary to the Ministry, to a deputation from the Cockburn Association which waited upon him in London on February 21 to oppose the Princes Street scheme on grounds of obstruction of traffic and public safety. A deputation from the Corporation had been received at the Ministry on February 14th with reference to the electrification of the tramways. The Tramways Committee have recommended that application be made to Parliament for powers to construct a tramway along George Street, connecting St. Andrew Square with the West End of the city, a route which would be parallel with Princes Street. The committee's decision is not a recommendation to proceed with the actual work of construction, but merely that a proposed clause should remain in the Provisional Order which is being promoted by the Corporation. The insertion of this clause is a precautionary measure that would avoid delay should the Town Council desire to proceed with the scheme. It was decided to delay consideration of Mr. Pilcher's report on the proposed electrification of the Northern routes until the committee had had an opportunity of receiving a deputation of the citizens resident in these districts who are desirous of the immediate electrification of the routes. Mr. Pilcher regards the electrification as too costly to be proceeded with immediately, and suggests that those routes should follow the electrification of the Portobello route. It was agreed to recommend an extension of the electric tramways from Nether Liberton to Liberton Dams, and a proposal to connect Portobello with the Leith system *via* Seafield Road was remitted to the manager for report. The Tramways Committee have considered the adoption of single-deck cars for use on certain routes, and the general manager was instructed to prepare a report and plans.

GLASGOW.

TRAMWAY PURCHASE CELEBRATED—ALL-NIGHT SERVICE—SUBWAY CLOSED—FOOTPATH RULE—ACCIDENT.

To mark the transference of the undertaking of the Airdrie and Coatbridge Tramways Company to Glasgow Corporation, a luncheon was given by Mr. P. N. Gray, a director of the tramways company. Among those present were—Provost Lavelle, Coatbridge; Provost Kennedy, Airdrie; Mr. James Dalrymple, general manager, Glasgow Corporation Tramways; Baile M'Whirr, convener, and Bailie Laing, sub-convener, of Glasgow Tramways Committee; and Mr. Archibald Robertson, ex-manager of the Airdrie and Coatbridge Tramways. At Coatbridge later in the day, Mr. Robertson, who has been general manager of the Tramways Company for 12 years, was presented by the staff with an inscribed silver rose bowl.—A report on the city's all-night service presented by the general manager showed a deficiency on the first year's working of £1,098. The subway was closed on Sunday, February 19, until further notice, owing to the revenue being insufficient to meet the expenditure. The subway was opened 25 years ago. It was at first successful, but the competition of the Corporation electric tramways reduced the traffic receipts, and in recent years the company has been unable to pay more than a small instalment of the interest on the preference capital, while last year there was a deficit of £15,000. The issued capital consists of £1,250,000 in preference and ordinary shares. A full account of the undertaking was published in the TRAMWAY AND RAILWAY WORLD of August, 1897. The magistrates, after having received a recommendation from the Tramways Committee, have decided to adopt the "Keep to the Left" rule of the footpath. Notices bearing this injunction are affixed to the lamp posts and inside the tramway cars. On February 8, a tramcar which had got out of control, traversed the full length of High Street, where there is a fairly steep gradient. In its course the car collided first with a lorry, then with a motor van, and finally with another lorry, which brought it to a standstill. The motorman was thrown out in the first collision. About 12 people were injured.

MANCHESTER.

MOTORMAN'S PLUCK—TRACK DOUBLING—1919 AGREEMENT.

A Corporation tramcar driver, Harry Ashworth, received an injury to his stomach by being flung against the controller when his car collided with a lorry. He remained at his post, and after a short delay drove the car to the depot. He arrived there in great pain and was removed to hospital where it was found he had sustained internal injuries. The Tramways Committee are applying to the

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Ministry of Transport for sanction for the doubling of the tramway track over the canal bridge in Hulme Hall Lane, and in Stanley Grove. The tramway employees have passed a resolution strongly resenting any revision of the 1919 Agreement that has for its object "a retrogressive step," and pledged their utmost support to the Executive Council in any action they may deem necessary to resist a violation of the principle of the Agreement. [A reference to the retirement of Mr. J. M. McElroy (general manager of the Corporation Tramways) will be found elsewhere in this issue.]

NORTH WALES.

LLANDUDNO AND COLWYN BAY TRAMWAY STRIKE.

The employees of the Llandudno and Colwyn Bay Electric Railway Company went on strike on Saturday, February 18, as a protest against the proposal of the company to make a reduction of 1s. per week in their wages in addition to the automatic decrease under the national sliding scale. Mr. Alex. G. Balfour (general manager of the company) stated that he placed the proposed reduction before the men at a meeting on February 15, when it was accepted by them. He understood that the men afterwards received some communication which seemed to have unsettled them, and the strike, without notice, was decided upon on the following Friday night. The men having left their work without notice, they had all been discharged from the company's service. Mr. Balfour pointed out that the wages and bonus of the employees had always been on a lower scale than those of the larger tramway undertakings, as the traffic is, in the main, of a seasonal nature. Mr. Balfour denied that there was any breach of an award on his part. Motor omnibuses have done good business in the absence of the tramcars.

SOUTHAMPTON.

TRAMWAYS EXTENSION.

The Swaythling tramway extension of the Corporation tramways, which consists of 3 furlongs 8·80 chains of double track, was inspected by Major Hall, of the Ministry of Transport, on February 20, and was opened for service on February 23. In addition to the Swaythling extension, a line was completed during the last few months to Millbrook. This line consists of 1 furlong 2·86 chains of double track, and 4 furlongs 2·42 chains of single track. The whole of the work has been carried out by the tramway department under the supervision of Mr. J. Dobson, general manager and engineer.

NEWCASTLE TRAMWAY STRIKE.

DISPUTE OVER THE 48-HOUR WEEK.

The operating staff of the Newcastle-upon-Tyne Corporation Tramways ceased work on Monday, February 27, and since that date up to the date of this issue the city has been without a car service. The Corporation's omnibuses have also been involved, and the public have had to rely upon private coaches, omnibuses, brakes, etc., for which the Watch Committee granted additional temporary licences.

The employees ceased work rather than consent to the Transport and Electricity Committee's decision to increase the working week from 44 to 48 hours. It will be remembered that following the decision of the City Council in December last to rescind a former resolution restricting the hours of municipal employees to 44 per week, the Transport and Electricity Committee on January 26 resolved to bring the tramway working hours into line with those fixed under the National Agreement of March 1919. The employees strongly resented this, and negotiated with the committee in the hope either of persuading them to nullify the increase or to grant a proportionate advance of pay. The committee, however, at first declined to accept the men's proposals, and reminded them that the increase in working hours was necessitated by the financial position of the undertaking. Not only would it mean a considerable reduction in expenditure, chiefly by obviating overtime, but would make possible a later car service. A sub-committee of the Transport and Electricity Committee on Sunday, February 26, issued a statement in which they remarked that, during the negotiations, representatives of the men asserted that the conditions asked for were equal to 8s. per week. This contention was not accepted by the committee, who, while maintaining their claim that the 48 hours' week should be worked in harmony with other tramway undertakings, recognised that the amount of wages now earned by motormen and conductors was slightly less than wages paid in other comparable towns, and offered to give an additional 1s. 6d. per week, exclusive of merit pay, which would have corrected this deficiency. Other advantages and improvements in conditions of working were in the course of negotiations amicably arranged for submission to the men. In accordance with a resolution of the Council, the increase of the working hours would not have involved any dismissals. "In view of the proposals agreed to by both parties for submission to the men having been rejected," the statement concluded, "these are now withdrawn. The depots will be open to-morrow (Monday) morning as usual for any men who care to report for duty, but the present rates of pay will operate for a 48-hours week."

ALDERMAN MAYNE'S STATEMENT.

Alderman R. Mayne (chairman of the Transport and Electricity Committee), addressing the City Council on March 1, said the committee had taken no steps to organise a service because they hoped that the men, after reflection, would realise they had made a mistake in refusing to accept an offer which, taken as a whole, was an improvement on the provisions of the National Agreement. "I deliberately assert," he added, "that the proposed settlement would have put Newcastle tramwaymen on terms and conditions equal to or above the average of Leeds, Manchester, Salford, Birmingham, Halifax, Cardiff, Nottingham, Hull, and Sunderland."

The employees held a ballot on March 8 to decide upon acceptance or rejection of the sub-committee's terms. These, according to a subsequent statement by the Lord Mayor, include a 48-hour week with union conditions, a wage of 67s., uniform, guaranteed employment, and eight days' holiday with pay. The terms were rejected by a majority of 832; only 90 employees voted for acceptance, and 46 men did not vote.

At a meeting of the Transport and Electricity Committee, held the following day, Alderman Mayne made a statement as to the negotiations that had taken place, and indicated the course that the committee proposed to adopt in view of the ballot. After discussion, a resolution was passed, with only one dissentient, fully endorsing the action of the sub-committee and maintaining the decision to adopt a 48-hour working week fixed by the National Joint Industrial Council. The committee stated that the men are at liberty to resume work at any time on the conditions laid down. The Corporation requested the men on strike to hand in their uniforms on March 14, but this the men declined to do, contending that this would mean the cancellation of their agreement with the Corporation.

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AN IMPORTANT ORGANISATION WITH INTERNATIONAL CONNECTIONS.

This company, whose offices are at 83 Kingsway, London, W.C.2, has acquired the goodwill of the Foundation Company of New York in Great Britain and the British Dominions other than Canada. Mr. Walter Rutherford is the managing director, and the other members of the Board are—Mr. A. W. Tait, C.B.E. (chairman), Mr. Franklin Remington, U.S.A. (deputy chairman), Lt.-Col. Fred W. Abbot, Sir Charles Davidson, and Mr. John Doty.

The staff organisation is as follows—Engineer-in-chief, Mr. John W. Doty, C.E., M.Am.Soc.C.E.; general manager and chief engineer, Mr. H. E. Midgley, M.A. (Cantab), M.Inst.C.E., M.Inst.E.E., M.I.Mech.E.; commercial manager (home), Mr. Douglas Kerr, M.A. (Cantab); commercial manager (export), Mr. A. A. Vanneck; estimating engineer, Mr. H. W. Kimber, M.I.Mech.E.; abstract engineer, Mr. A. Paterson, M.I.Mech.E.

The organisation thus includes a number of well-known men who have been associated with many representative construction undertakings in this country and abroad. The principal executive officers have had wide and varied experience in the construction and equipment of railways, tramways, generating stations, etc., and the company will carry on business as engineers and contractors. The experience placed at its disposal by the American company covers a variety of constructional work, including industrial plants, power plants, hydro-electric developments, railways, tunnels, bridges, highways, etc. The American company has similar associated companies or branch offices in Canada, Mexico, and South America, and in France and Spain, and there will be a close association and continuous exchange of information between the English company and the several other companies, as well as with the American company in New York.

INQUIRY INTO DIVERTED TRAFFIC.

The Association of British Chambers of Commerce and other organisations of traders are making a joint inquiry among their members as to the extent to which they have diverted traffic from railways to road transport on account of the high rates of the former. It is sought to discover how much of the diverted traffic would return to the companies if rates were materially reduced, and what increased tonnage would be sent by rail on other grounds. A material feature of the inquiry is an attempt to discover how much prices of commodities which ought to be sent by rail are now above pre-war values, and what percentage of reduction in rates is necessary to assist new business. The results of the inquiry will be communicated to the railway companies.

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CONTRACTS AND ORDERS.

St. Helens Tramways Committee have authorised their Motor Car Sub-committee to purchase a light motor car.

Douglas (I.O.M.) Town Council have decided to purchase a double-deck 48-seater Tilling-Stevens motor omnibus at £1,700.

Bournemouth Tramways Committee have accepted the tender of Walter Scott, Limited, for 220 tons of new rails at £13 17s. 6d. per ton.

Yarmouth Tramways Committee are obtaining a No. 1 "Celerity" Rail Grinder from the Equipment and Engineering Company at a cost of £112 8s.

The British Insulated and Helsby Cables, Limited, are to supply 1,000 66-in. copper rail bonds at a price of 3s. 7½d. each to Bradford Tramways Committee.

The Takata Company, of Japan, has ordered another large turbine-generator for one of its new plants from the Westinghouse Electric and Manufacturing Company, of Pittsburg, Pa.

The English Electric Company, Limited, has received an order from Preston Corporation Tramways Committee for covering in the fronts of the five remaining uncovered tramway cars.

Bolton Tramways Committee have recommended acceptance of the tender of the Equipment and Engineering Company (London) for a rail grinder and a welder for use on the tramway track.

Leyton Corporation have been recommended to accept the tender of the Brush Electrical Engineering Company for the supply of a charging motor generator for the electric vehicle garage at £410 5s.

L.C.C. Tramways Special Track Work.—The continuance for a further period of 12 months of the arrangement between the London County Council and Hadfields, Limited, for the supply of special track work has been sanctioned.

The General Electric Company, Limited, in addition to the large order for the electrical equipment of the Brighton Railway Company, have in hand contracts for generating plant for China and India, including one for the Bombay and Baroda Railway.

Burnley Tramways Committee have recommended acceptance of the following tenders—Walter Scott, Limited, Leeds, 200 tons of Titanium-treated steel rails, at £12 5s. per ton; Thermit, Limited, London, welding of 400 joints on terms mentioned in their tender.

Leeds Corporation Tramways Committee have accepted the following tenders—One mile of circular trolley wire, Tramway Supplies, Limited; 45-H.P. motor for the Kirkstall Road depot, J. W. Hinchliffe; ten partial electrical equipments for tramway cars, the English Electric Company, Limited.

Straker-Squire, Limited, of Edmonton, London, N., have received a repeat order from the Leigh Corporation for six single-deck omnibuses of the "A" type, the bodies to have front and rear entrances. This Corporation are already running six Straker-Squire omnibuses in Lancashire.

The Electro-Mechanical Brake Company, Limited, of West Bromwich, have received an order through the English Electric Company, Limited, for 75 car sets, and through the Metropolitan-Vickers Electrical Company, Limited, for 50 car sets of E.M.B. unbreakable resistances required for the 60-H.P. equipments of the new London County Council cars.

Ayr Town Council have accepted the following tenders for laying a double tramway track in Prestwick Road and five passing places—Alexander Stark and Sons, Limited, at £12,201; Hadfields, Limited, for about 1,350 tie bars at 2s. 10d. each; Thermit, Limited, to do the Thermit welding required at 30s. per joint (probably 240 joints) plus wages of the welder at £4 10s. per week.

Hull Corporation Tramways Committee have accepted the tender of Walter Scott, Limited, Leeds, for 1,000 tons of steel rails at £12 per ton, plus certain additional charges in connection with Sandberg's patent sorbitic treatment. The committee decided not to consider any offers from Germany. The lowest German tender was £11 15s., with £1 per ton for special treatment.

The Bradford Tramways Committee have ordered from Cole, Marchent and Morley, Limited, 20 tons of cast-iron track brake blocks at 9s. 3d. per cwt., and 20 tons of scrap brake blocks; from Messrs. T. H. Newsome and Company, 1,000 gallons of heavy lubricating oil at 2s. per gallon; from E. Brooksbank and Company, Limited, 2,500 gallons of machinery lubricating oil at 1s. 10d. per gallon; and from H. Summersgill, iron castings at 34s. per cwt.

Halifax Tramways Committee have accepted tenders as follows—Alexander McBean & Son, Wolverhampton, for 100 tons of rails, at £12 14s. per ton, and 4 tons of fish plates at £16 10s. per ton; Metropolitan-Vickers Electrical Company, Manchester, for two spare armatures, at £95 each; the English Electric Company, Limited, for the supply of three controllers at £55 each. The committee have referred tenders for a single-deck omnibus to a sub-committee, with power to act.

PERSONAL.

Mr. A. Nicklin has been appointed electrical and mechanical engineer of Swindon Corporation at a commencing salary of £500 per annum.

Mr. F. Bunney, an inspector at Westminster station, who is in his 70th year, retired on February 28, after serving nearly 42 years with the Metropolitan District Railway.

Mr. W. H. Alabaster, city electrical engineer of Melbourne, has been authorised by the City Council to visit this country to inquire into electrical matters, new machinery, etc.

Lieut.-Col. D. J. Smith, O.B.E., has been unanimously elected president of the Institution of Automobile Engineers for the Session 1922-23, and Messrs. H. G. Burford and L. H. Hounsfield, vice-presidents.

Mr. A. E. Wray, formerly of Dick, Kerr and Company, Limited, and subsequently of the English Electric Company, Limited, has joined the staff of G. D. Peters and Company, Limited, 3a, Dean's Yard, London, S.W.1.

Mr. H. H. Gordon, who for many years has been a member of the Highways Committee of the London County Council, and has taken particular interest in tramway matters, did not stand at the triennial election of the Council on March 2.

Mr. J. A. S. Wood, assistant manager of Manchester Corporation Tramways, is about to retire on superannuation. He has been in the service of Manchester Corporation for about 45 years, and has occupied his present position for eight years.

Mr. James Makin, chief electrical engineer to the Bexley Urban District Council, and engineer and general manager of the Bexley Tramways and Dartford Light Railways joint undertaking, has been appointed chief electrical engineer to the city of Hereford.

Sir John Timpson, K.B.E., K.S.T., O.R.S., was entertained at luncheon at the Hotel Russell on February 10 by the Executive Council of the Municipal Tramways Association, of which he is vice-president. Alderman R. Mayne, of Newcastle, president of the Association, was in the chair, and all members of the Council were present, with the exception of one or two who were unavoidably detained. The company gathered to express to Sir John their gratification at the honour lately conferred upon him, and the remarks of Mr. Mayne and other speakers testified to the high esteem and affectionate regard in which he is held by his colleagues. Sir John has had a long and distinguished municipal career at Portsmouth; in fact there is scarcely a department of municipal activity in which he has not borne a useful part. As chairman of the Tramways Committee for many years he has been largely instrumental in the development of that undertaking. Thrice mayor of Portsmouth during the crucial years of the war, his services to the country in receiving foreign representatives, and in many other activities, have indeed well merited a knighthood of the British Empire.

On February 17 Sir John was the guest at dinner of the Metropolitan Municipal Tramway Managers and some personal friends at the Sports Club, St. James' Square, London, S.W. Mr. A. L. C. Fell, C.B.E., general manager of the London County Council Tramways, was in the chair, and among those present were Sir John W. Courtis, Col. Sir T. A. Polson, M.P., the Rt. Hon. G. H. Roberts, M.P., Messrs. G. K. Bruce, T. B. Goodyer, L. E. Harvey, W. Murray, W. R. Spaven, L. Slattery, W. C. Ullmann, J. C. Williams, J. Beckett, and A. Ellis.

We regret to record the death of **Mr. Wm. E. Kenway** at the age of 77 years. Mr. Kenway was formerly many years general manager of the Birmingham and Midland Tramways.

Alderman E. H. Sellers, J.P., who for nearly seven years has been chairman of the Huddersfield Corporation Tramways Committee, died on March 1 after a short illness. Alderman Sellers, who was 68 years of age, entered the Town Council in 1907, and was appointed to the Tramways Committee in 1908. In 1915 he was elected deputy chairman of the committee and a few months later was appointed chairman. He took the deepest interest in all matters connected with the tramways department. His magnetic personality made him highly esteemed by every member of the staff, and the department owes much to his unfailing diplomacy and shrewdness. Alderman Sellers was a member of the Executive Council of the Municipal Tramways Association and devoted much of his time to national tramway problems.

Return Fares in South London.—The South Metropolitan Electric Tramways on March 8 introduced cheap return fares on the Croydon-Sutton and Croydon-Tooting routes, as follows—All 4d. ordinary single fares, 7d. return; 5d. single fares, 8d. return; 6d. single fares, 10d. return.

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TRAMWAY MANAGERS' RESIGNATIONS.

Mr. J. M. McElroy, general manager of Manchester Corporation Tramways, has tendered to the committee his resignation, which they have accepted with regret. Mr. McElroy has long suffered from ill-health, and it has been known for some time that he intended to retire. His withdrawal from active life will be received with great regret throughout the tramway industry, whose interests he has done so much to advance. Mr. McElroy entered the service of the Manchester Highways Department as a youth in 1880, when horse-drawn cars, owned by a private company, were in use. About 15 years later, when he had become principal assistant in the department, and preparations were being made for municipalisation of the tramways, he was transferred to the Tramways Department and became secretary and adviser to the new committee. In 1901 he was appointed general manager of the undertaking, and has held the office with a distinction and ability which have won him a reputation not only in Manchester but throughout the country as an expert on tramway matters. Mr. McElroy has been a member of the Executive Council of the Municipal Tramways Association since its inception, and was president in the year 1906-7. He has studied the transport undertakings of several cities in Europe and the United States, and his report to the Corporation in 1914 on traffic problems attracted considerable attention. Mr. McElroy frequently acted in an advisory capacity to other tramway authorities, and had served as an arbitrator on behalf of the Board of Trade, in tramway disputes. On the Joint Industrial Council he represented the Lancashire and Cheshire area. During the war Mr. McElroy served the Government in the Departments of the Admiralty, the Board of Trade, and the Ministry of Munitions. It is understood it will be some months before Mr. McElroy's resignation takes effect.

Mr. Ernest Hatton has tendered his resignation to the Transport and Electricity Committee of Newcastle-on-Tyne as general manager and engineer of the City's tramways. Mr. Hatton's health has for a long time not been good, and he has decided to take a long rest. Mr. Hatton's withdrawal from the position he has so ably filled for 17 years will be a great loss to Newcastle. When he came from Salford the Newcastle tramways were in a very unsatisfactory position, but under his management they soon became a profitable undertaking, and they have contributed considerable sums to the relief of rates. The system has been extended under his direction, and prior to the comparatively recent rearrangement of fare stages the fares were among the lowest in the country. Owing to the position of Newcastle, the maintenance of the service during the war involved exceptional difficulties. The staff was, of course, greatly depleted, and Mr. Hatton organised a scheme of volunteer drivers and conductors to assist in carrying the thousands of munition workers to the factories and home again in the evening. Mr. Hatton's abilities are appreciated throughout the tramway field, and only recently his advice was sought by some continental tramway undertakings in connection with plans for handling large volumes of traffic at holiday times, which has been a feature of the Newcastle management. The Corporation Transport and Electricity Committee received Mr. Hatton's resignation with regret, and places on record their high appreciation of his services. It was decided to advertise for a successor.

Mr. J. W. Hame, having resigned the position of electricity engineer and tramways manager of York Corporation, the Council propose to appoint a whole time electricity engineer and also a whole time tramways manager, preferably an engineer. The salary of the former position will be £650, and of the second £600 per annum. Mr. E. J. Nicholls has been recommended for the city electrical engineer.

Alderman Sir William E. Clegg, J.P., chairman of Sheffield Corporation Tramways and Motors Committee, is to receive the Freedom of the city on April 21 next, to mark his 70th birthday. It is chiefly in connection with the development of the tramways that Sir William's great work for Sheffield is known. He was first appointed chairman of the Tramways Committee when that body was formed in 1896, on the acquisition of the tramway system by the municipality, and it is largely owing to his foresight and ability that the undertaking has developed to its present state of efficiency. Under his chairmanship motor omnibuses were introduced, and their operation has proved popular and successful. Sir William filled the office of Lord Mayor in 1898. In 1902 he was elected chairman of the Education Committee, and since the inception of Sheffield University he has represented the Sheffield Education Committee on the University Council. In 1912 he received from the University the honorary degree of LL.D., and in 1918 was made a C.B.E. in recognition of his work as chairman of the local munitions committee.

Mr. Charles I. Baker, who for the past 12 years has been traffic superintendent to the Blackpool Corporation Tramways, has been appointed tramways manager to the Ashton-under-Lyne Corporation in succession to the late Mr. Ernest Holt.

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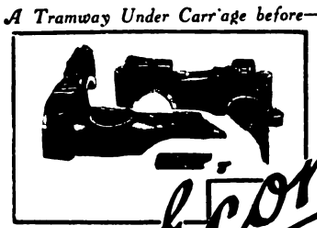
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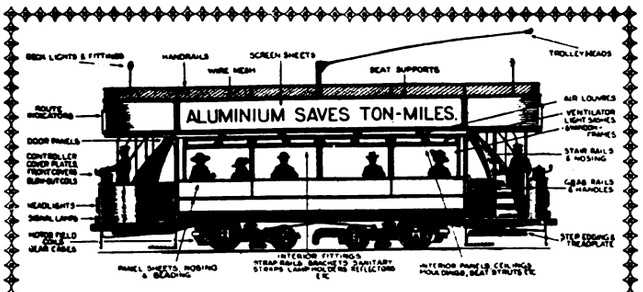

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PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given in italics.

APPLICATIONS FOR LETTERS PATENT.

The number of the patent is given in brackets.

Control gear for electric driving mechanism (4,053)—Associated Equipment Company, Limited, and C. K. Edwards.
Brakes for front, etc., steering wheels of motor vehicles (4,018)—H. Chandler and H. P. Girling.
Variable speed gears for motor vehicles (3,789)—J. H. Dolton.
Live rails in systems of electric traction (3,701)—G. Ellson and S.E. and L.C. & D. Railway Companies' Managing Committee.
Motor vehicle (3,542)—H. Grade.
Gear arrangement for motor vehicles (3,543)—H. Grade.
Control of electrically-propelled vehicles (4,718)—C. F. Barnholdt and the English Electric Company, Limited.
Motor vehicles (4,308)—L. M. Bernon and A. E. L. Morelle.
Lamp fittings for self-propelled vehicles (4,582)—British Thomson-Houston Company, Limited, and L. Griffiths.
Two-speed gear and clutch for motor vehicles (4,558)—J. F. Farris.
Motor vehicles (4,189)—A. J. McDonald.
Variable speed gears for motor vehicles (4,665)—S. D. Marchant.
Locking device for brake levers of motor vehicles (4,425)—J. Mercer.
Sand pipe adjuster for electric cars (4,557)—J. Reid.
Radiators for internal combustion engines (4,220)—H. P. Saunderson.
Gear changing mechanism for motor vehicles (4,724)—F. Shaw.
Motor vehicles (4,531)—A. Thomas.
Trackless trolley vehicles (5,392)—G. N. Cadbury and A. W. Maley
Tramway trolley head (4,992)—A. Challinor.
Variable speed gears for motor vehicles (5,185)—W. H. Facon.
Direction indicators for road vehicles (5,186)—J. Florendine.
Tramway rails (5,013)—L. R. Moir and G. H. Walker.
Jacking appliances for vehicles (5,656)—E. M. Scott and H. C. Tuck.
Electrically-controlled direction indicators (5,085)—F. H. Watts.
Brake mechanism (6,145)—G. L. Atkinson.
Trolley wheels for electric tramways (6,258)—P. P. Berthet.
Electric railway signal repeating system (6,113)—J. Bethenod.
Route indicator for vehicles (5,717)—J. Brailsford and F. Neimeyer.
Bodies for motor vehicles (6,459)—M. A. Buch.
Splash guard for road vehicles and tramcars (6,196)—G. Caddick.
System for road traffic control (5,858)—C. H. Campbell.
Tram rails (6,388)—E. J. Flynn.
Brake blocks, electric collector shoes, etc., for railway vehicles (6,179)—R. P. Foster and J. W. Taylor.
Motor vehicles (6,433)—R. T. Glascodine and Spencer, Moulton and Company, Limited.
Turnstiles for registering and checking passengers (6,367)—London Electric Railway Company and J. P. Thomas.
Motor vehicles (5,680)—H. J. Playford.
Variable speed gears for motor vehicles (5,840)—W. O. Spinks.
Friction gearing for motor vehicles (5,992)—H. Tasker.
Means for supporting and insulating conductors of electric overhead distribution (6,205)—G. V. Twiss.
Steering gear for motor vehicles (6,299)—R. J. Urquhart.
Motor vehicles (6,300)—R. J. Urquhart.
Means for sanding rails of tramway tracks (5,720)—A. Wheatcroft.
Trailer connection and gap guard for traction (6,040)—V. H. Whiteman.
Slack adjusters for connecting links for car-couplers (5,953)—J. Willison.
Traffic signal for vehicles (6,022)—R. J. Woods.
Striding motion driving gear for motor vehicles (6,443)—V. Zboril.

SPECIFICATIONS PUBLISHED

1920.

Steering devices for motor vehicles (20,767—*148,946*)—Drake Manufacturing Company.
Change speed gears for motor vehicles (23,562—*173,812*)—S. de Santis.
Ground levers for tramway points (28,398—*173,857*)—H. A. Thomson.
Electrical contact makers for use with the steering wheels of motor vehicles (28,681—*173,878*)—J. L. Scott.
Chassis for motor road vehicles (30,828—*173,928*)—F. Mills.
Axles of motor road vehicles (33,243—*173,947*)—F. J. Mitchell.
Brake blocks with removable brake surfaces (20,594—*148,856*)—K. Fleischer.
Rear axle drive for motor vehicles (21,080—*151,921*)—E. Rumpler.
Car trucks (24,672—*174,110*)—S. B. Brilhart.
Lifting jacks (26,566—*174,123*)—W. Williams and S. R. Fairclough.
Brake for motor vehicles (31,277—*174,232*)—F. Winterbottom.
Safety controlling gear for electrically-propelled vehicles (35,438—*174,512*)—R. Garrett and Sons, Limited, and A. J. Serve.
Brakes for electric tramcars (32,747—*174,795*)—C. J. Spencer.

1921.

Steering gear of motor vehicles (2,287—*174,281*)—T. Ramage.
Driving mechanism for the rear axle(27,105—*170,295*)—E. Rumpler.
Rear axle drive for motor vehicles (27,106—*170,296*)—E. Rumpler.

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TRAFFIC RETURNS.

Tramway and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1921. WEEKS ENDED Feb. 12	Feb. 19	Feb. 26	Mar. 5		1922. WEEKS ENDED Feb. 11	Feb. 18	Feb. 25	Mar. 4		AGGREGATE. Wks.	1921-22.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	3,421	3,480	3,382	3,601	...	3,046	3,182	3,288	3,397	...	39⅞	139,603	− 12,295
Aberdeen Motor Buses	55	60	57	67	...	142	133	131	153	...	39⅞	9,315	+ 8,119
Ayr Corporation	537	548	538	544	...	460	475	477	503	...	42	29,997	− 2,195
Barrow Corporation	854	862	847	874	...	612	606	651	653	...	48	39,552	− 3,812
Belfast City Tramways	10,902	11,156	11,168	12,007	...	11.852	11,401	11,580	12,277	...	48	601,221	+ 51,527
Birkenhead Corporation	2,518	2,573	2,593	2,564	...	2,373	2,469	2,562	2,618	...	47⅞	125,820	− 13,170
Birkenhead Motor 'Buses	361	365	384	370	...	466	519	532	592	...	47⅞	31,910	+ 12,049
Birmingham Corporation	31,911	32,381	32,057	31,657	...	27,182	27,806	28,982	28,883	...	48	1,404,089	− 126,171
Birmingham Motor 'Buses	1,808	1,870	2,310	2,284	...	1,644	1,683	1,786	1,931	...	48	94,398	− 2,574
Blackburn Corporation	2,328	2,404	2,465	2,409	...	2,094	2,043	2.202	2,158	...	48⅞	114,664	− 10,837
Bradford Corporation	13,761	14,859	13,644	13,926	...	12,909	13,175	13,878	13,948	...	48	658,575	+ 10,034
Burnley Corporation	3,516	3,426	3,498	3,606	...	3,257	2,996	3,304	3,196	...	—	—	—
Burton-on-Trent Corporation ...	593	596	605	615	...	560	557	597	590	...	48	29,985	+ 392
Bury Corporation	2,384	2,385	2,531	2,451	...	2,211	2,159	2,288	2,285	...	48⅞	116,901	− 5,524
Chatham and District	1,432	1,511	1,592	1,581	...	1,357	1,466	1,444	1.544	...	9	12,607	− 1,553
Chesterfield Corporation	623	634	618	628	...	571	559	556	554	...	48	28,017	− 745
Chesterfield Motor Buses	863	880	860	854	...	660	683	690	696	...	48	36,222	− 2,690
Derby Corporation	2,154	2,308	2,391	2,295	...	1,927	2.024	2,078	2,089	...	48	103,337	− 7,544
Dundee City	3,186	3,150	3,063	3,068	...	2,940	2,932	2.889	2,998	...	41⅞	132,163	+ 4,949
East Ham Corporation	2,019	2,019	2,140	2,107	...	2,000	2,092	2,134	2,206	...	48⅞	102,156	+ 2,225
Edinburgh Corporation	...	...	...	...	...	10,701	10,888	11,720	11,696	...	42	528,046	+ 4,074
Edinburgh Motor 'Buses	...	...	...	...	...	3,075	3,154	3,409	3,319	...	42	148,795	—
Glasgow Corporation	44,811	45,837	45,167	45,903	...	42,912	43,935	43,480	45,343	...	39⅛	1,786,193	+ 1,432
Glossop (Urban Elec. Supply Co.)...	225	220	224	230	...	214	238	229	231	...	9	2.064	− 43
Halifax Corporation	4,234	4,362	4,215	4,395	...	3,719	3,642	3,709	4,101	...	46⅛	204,210	− 379
Halifax Motor 'Buses	111	110	106	115	...	67	64	61	71	...	46⅛	5,666	− 1,680
Halifax Railless Cars	...	...	...	...	...	40	38	43	42	...	32	1,686	—
Huddersfield Corporation	5.177	5,207	5,265	5,240	...	4,701	4,640	5,083	5,205	...	49	253,575	+ 8,115
Ilford U.D. Council	1,253	1,328	1,397	1,378	...	1.388	1,388	1,452	1,503	...	48⅞	72,282	+ 9,930
Ipswich Corporation	766	788	820	820	...	678	707	726	779	...	48	41,141	− 5,144
Isle of Thanet...	487	481	539	560	...	467	506	520	590	...	21	13,216	+ 1,096
Kilmarnock Corporation	356	357	376	374	...	323	317	330	325	...	41⅞	14,972	− 535
Leicester Corporation	6,448	6,215	6,346	6,550	...	6,863	7,044	7,211	7,615	...	9	64,228	+ 5,847
Liverpool Corporation	25,956	26,208	29,084	29,958	...	26,960	27,644	28,983	29,438	...	9	257,376	+ 11,238
London County Council	97,529	98,410	99,693	100,867	...	88,751	89,255	90,826	96,437	...	48	4,677,496	+ 196,569
Maidstone Corporation	386	401	413	416	...	354	374	372	395	...	47	22,498	− 572
Manchester Corporation	37,632	37,699	38,758	38,100	...	35,786	36,298	37,507	37,395	...	48	1,858,137	+ 181,630
Newcastle-on-Tyne Corporation ..	11,344	11,234	11,299	11,306	...	10,415	10,426	10,647	*Strike*	...	48	526,492	− 6,867
Nottingham Corporation	7,204	7,452	7,321	7,451	...	7,194	7.311	7.432	7,623	...	48	329,905	− 40,843
Oldham Corporation	4,485	4,690	4,754	4,408	...	4,422	4,313	4,480	4,562	...	50	234,112	+ 2,570
Preston Corporation	1,827	1,843	1,803	1,866	...	1,732	1,715	1,722	1,857	...	47⅛	90,974	+ 3,224
Preston Motor 'Buses	...	...	...	...	...	137	125	133	133	...	5⅞	720	—
Reading Corporation	1,455	1,540	1,496	1,513	...	1,392	1,423	1,478	1,509	...	48	75,634	− 3,749
Reading Motor 'Buses	234	259	259	255	...	277	280	300	326	...	48	16,176	+ 3.496
Rotherham Corporation	2,750	2,747	2,703	2,707	...	2,242	2,162	2,188	2,210	...	47	106,296	− 19,635
St. Helens Corporation	2,044	2,088	2,032	2,098	...	1,550	1,515	1,582	1,649	...	48	85,070	− 14.994
Salford Tramways	10,558	10,551	11,353	10,420	...	9,954	9,933	10.838	10,294	...	47⅞	514,676	+ 20,893
Sheffield Corporation...	20,542	20,399	20,318	20,019	...	17,970	18,238	18,499	18,754	...	48⅞	935,837	− 71,742
Southampton Corporation	2,905	2,923	2,977	2,929	...	2,882	2,788	2,783	2,871	...	48	141,714	− 9,101
Southampton Motor 'Buses	182	181	189	184	...	100	93	94	97	...	48	7,190	− 4,421
Southend Corporation	1,525	1,589	1,691	1,682	...	1,730	1,773	1,814	1,973	...	48	117,675	+ 7,721
South Shields Corporation	1,854	1,871	1,862	...	...	1,588	1,633	1,672	...	...	48	80,240	− 11,122
Sunderland Corporation	2,727	2,789	2,816	2,757	...	2,370	2,469	2,524	2,578	...	48	125,454	− 21,391
Swindon Corporation	340	368	355	366	...	313	326	316	348	...	47⅛	18,644	+ 127
Tyneside Tramways and Tramroads	1,108	1,181	1,145	1,156	...	842	865	860	806	...	9	7,008	− 2,936
Wallasey Corporation	2,527	2,553	2,560	2,560	...	2,294	2,353	2,498	2,583	...	48⅞	133,626	+ 7,037
Wallasey Motor 'Buses	122	130	133	136	...	193	175	217	196	...	48⅞	11,312	+ 3,115
Walsall Corporation	1,853	1,913	1,904	1,862	...	1,563	1,606	1,680	1,673	...	48	79,007	− 8,807
Walsall Motor 'Buses	1,316	1,287	1,257	1,274	...	883	898	958	944	...	48	45,064	− 12,138
Walthamstow U.D. Council	1,779	1,815	1,926	1,889	...	1,622	1,679	1,722	1,751	...	48⅞	97,048	− 879
Warrington Corporation	1,028	1,038	1,026	1,098	...	993	980	1,003	1,044	...	48	47,933	− 495
West Ham Corporation	5.888	5,927	6,080	6,041	...	5,486	5,533	5,625	5,783	...	48	282,574	+ 2,221
Wolverhampton Corporation ...	2,245	2,203	2,240	2,340	...	2,127	2,185	2,290	2,342	...	49	113,966	− 4,262
Wolverhampton Motor 'Buses ...	618	590	629	610	...	621	640	664	666	...	49	32,025	+ 8,944

Underground Electric Railways Company of London, Limited.

NAME OF COMPANY.	1921. WEEKS ENDED Feb. 12	Feb. 19	Feb. 26	Mar. 5		1922. WEEKS ENDED Feb. 11	Feb. 18	Feb. 25	Mar. 4		AGGREGATE. Wks.	1922.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£			£	
Underground Rlys. & L.G.O. Co. ...	...	...	...	227,359	...	204,433	208,250	214.665	230,155	...	9	1,879,724	− 170,037
London and Suburban Traction ...	...	...	...	50.164	...	44,092	45,430	47,421	49.245	...	9	406,943	− 36,676

Colonial and Foreign Tramway Traffic Returns.

Companies Issuing Weekly Returns.

NAME OF COMPANY.	1921. WEEKS ENDED Feb. 12	Feb. 10	Feb. 26	Mar. 5		1922. WEEKS ENDED Feb. 11	Feb. 18	Feb. 25	Mar. 4		AGGREGATE. Wks.	1922.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	76,472	78.001	78,802	81.890	...	82,101	81,559	84,461	83,025	...	9	738,413	+ 21,943
Calcutta ... ... Rs.	* 159	* 3.288	*25,334	85.052	...	107,938	109,538	110,402	108,937	...	9	942,641	+ 457,791
Madras... ... ... Rs.	(2 weeks)	...	(2 weeks)	* 9,511	...	(2 weeks)	48,860	(2 weeks)	39,503	...	8	193,602	+ 145,893
Pernambuco	4,789	4,655	4.458	4,702	...	3.626	3,750	4,017	3,971	...	9½	34,537	− 10,020

Companies issuing Monthly Statements only.

	1920. Sept.	Oct.	Nov.	Dec.	1921. Jan.	Feb.	1921. Sept.	Oct.	Nov.	Dec.	1922. Jan.	Feb.	Wks.	AGGREGATE. 1921-22.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo	4,192	4,442	4,810	4,601	5,342	...	4,231	4,682	5,137	4,762	5.565	...	40	45,852	+ 2,909
Brazilian Trac. Mlrs	12043000	1,344200	12199000	12600,000	12875000	...	14471000	15016000	14555000	15405000	15032000	...	4	15,032,000	+ 2,157,000
Brisbane	45,430	46,310	...	...	46,280	...	46,220	47,880	...	...	48,790	...	4	48.790	+ 2.510
British Columbia $	806.797	835,054	858,842	917,668	908,385	...	845,185	845,973	877,335	940,113	907,242	...	30	6,100,157	+ 174.401
Buenos Ayres L'c'z	53,603	57,619	56.746	68,857	61,111	53.952	55,873	58,492	58,056	63.381	61,198	55.227	34	460,044	+ 8,695
Burma	50.235	55,763	53.696	50.481	50,035	48,405	58,974	64,778	58,271	54.194	59,362	52.380	30	403,127	+ 45,959
Cape Town ...	23,699	...	25.628	29,768	...	...	25,755	26,839	27,004	31,521	30,289	...	—	—	—
Carthagena & H. ...	2,273	3,319	2.714	5,560	3.877	2,839	4,244	3.862	1,717	3,237	3,075	2.773	8	5.848	− 868
Cordoba	19,597	19,627	19,122	19,299	18,696	...	23,204	23,203	22,698	22,641	22,152	...	43	230,068	+ 32.934
East India ...	4,228	4,299	4,234	4,271	4,299	3,819	4,154	4,054	3,945	4,058	4,080	3,737	30	28,571	− 688
Kalgoorlie... ...	3,361	3,094	2.969	...	...	...	2,829	2,406	2,419	...	...	...	48	24,944	− 8,728
La Plata	5,656	6,310	5.573	...	6.506	*728	...	6,587	6,453	...	...	6,318	52	13,041	+ 5,806
Manila ... $	280,352	327.652	320,345	315,599	321.449	...	322.212	323.108	306,850	316,467	309,252	...	4	309,252	− 12,197
Monte Video ...	41,816	45.246	43,846	...	50.863	48,119	44,927	47,927	47,426	...	32,634	48,111	17	180,301	− 11,462
Para	23,174	26,772	24,273	24,253	24,231	...	22,225	25,548	23,147	22.660	22,966	...	9	45,626	− 2,858
Port Elizabeth ...	5,803	...	6,620	8,185	...	...	6,477	6,788	6,828	8.344	8,120	...	—	—	—
Rangoon ... Rs.	114,857	111,830	104,468	120,000	122.588	...	132,225	151,000	137,750	145.500	137,850	...	4	137,850	+ 15,292
Winnipeg ... $	426,647	444,899	477,957	...	506,229	...	417,174	441,315	477.880	...	507,047	...	4	507,047	+ 818

* Strike of Employees.

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Tramway and Omnibus Advertising Contractors

Offices

LONDON	*Amberley House, Norfolk Street W.C.2*	**BIRMINGHAM**	*147 Corporation Street.*
EDINBURGH	*34 St. Andrew Square*	**LEEDS**	*Standard Assurance Buildings,*
LIVERPOOL	*64 South Castle Street*	**NEWCASTLE-on-TYNE**	*77 Westgate Road* [*City Square.*

SOLE CONTRACTORS FOR

Liverpool Corporation Tramways.
Edinburgh Corporation Tramways and Omnibuses.
Belfast City Tramways.
Leeds City Tramways.
Birmingham Corporation Tramways and Omnibuses.
Leicester Corporation Tramways.
Nottingham Corporation Tramways and Omnibuses.
Portsdown & Horndean Light Railway Co.
Wakefield & District Light Railway.
Calcutta Tramways Co., Ltd.
Cawnpore Electric Tramways.
Delhi Electric Tramways.
Mandalay Electric Tramways.
Newcastle-on-Tyne Corporation Tramways.
Isle of Thanet Electric Tramways Company, Ltd.
Keighley Corporation Tramways.
Keighley Corporation Railless Cars.
Burton-on-Trent Corporation Tramways.
Scarborough Electric Tramways Co., Ltd.
Aberdeen Suburban Tramways Co.
Hastings & District Electric Tramways Co., Ltd.
Gosport and Fareham Tramways Co.
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Cardiff Corporation Tramways.
Gloucester Corporation Light Railways.
Ilkeston Corporation Tramways.
Stockport Corporation Tramways.
Ilford Council Tramways.
Bradford Corporation Tramways.
Halifax Corporation Tramways.
Perth Corporation Tramways.
Malta Tramways Company.
Coventry Corporation Tramways.
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Croydon Corporation Tramways.
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Dear Sirs, 16.11.1921.

"I am rather pleased at the record made by your Chassis No. 15363, which was placed in service by us on 1st July, 1920, and which is now about to come in for overhaul.

This chassis has now covered a total of 60,500 miles without coming in for heavy repairs."

Yours faithfully,
(Sgd.) E. B. HUTCHINSON,
General Manager.

FOR PASSENGERS
28 to 57 Seating Capacity

FOR GOODS
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ALL CHASSIS PRICES GREATLY REDUCED

One of Edinburgh Corporation's fleet of 29 A.E.C. Single Deck Omnibuses.

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BUILDERS OF LONDON'S BUSES

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MOTOR TRAFFIC SECTION—SEVENTEENTH YEAR OF PUBLICATION.

THE RAILWAYS' ROAD SERVICES.

Since this subject was last mentioned in these notes developments have been rapid. The railways directly concerned in the promotion of the Bills now before Parliament have shown themselves both astute and reasonable in dealing with prospective opposition. For the most part this opposition came originally from three quarters, namely, the general trading community, the municipalities, and the motor trade and using interests. As regards the first, the policy adopted by the railways has been mainly an educative programme. It has been pointed out to Chambers of Commerce and other kindred bodies that the proposals, if adopted, would not lead to the abolition of competition between rail and road, but rather to the accentuation of competition on the roads. Some road carriers have undoubtedly treated their customers in a rather casual manner, with the result that rates have been very variable, some traders being charged much less than others for comparable services. The railways point out that they will run their services on strictly business lines, that their rates will be limited, and that the trading community will thereby benefit. They maintain that they are willing to submit to safeguards which will not allow them to drive competition off the roads or to exploit the public by overcharging. The opposition of the municipalities has been based principally on the fear that the railways will operate passenger-carrying services in competition with municipally-owned trams and omnibuses, and therefore to the detriment of the ratepayer. This objection has been dealt with by an undertaking on behalf of the railways for a period of years not to seek powers to run road services other than for the carriage of goods. Motor users, so far as they operate services with which the railways propose to compete, naturally remain in opposition, and nothing in the way of a compromise can get over the fundamental fact that these people must suffer from the loss of any traffic that is transferred to the railways' services. Equally, the retail motor trader cannot be placated, because it is evident that the railways would never purchase vehicles through him, and neither would they use his services as a supplier of fuel and other commodities or for the purpose of maintaining or repairing their machines. The most that they can do in this direction they have already offered, inasmuch as they have given an undertaking not to use their own repair depots as public garages and not to sell supplies from them or to offer maintenance facilities to other vehicle owners. The opposition of the motor manufacturers was mainly due to the fear that the railways would build their own vehicles, and that, pending the completion of arrangements for manufacture, they might purchase secondhand vehicles declared surplus by the Government. In this case no new business would have come to the industry, and there would be nothing to compensate it for the loss of some at least of the business done with existing road carriers. These objections have been met by the offer of an undertaking on behalf of the railways not to manufacture vehicles themselves and to purchase only new vehicles, these to be for the most part of British origin. By taking these steps the companies have undoubtedly much weakened the opposition that they would otherwise have encountered, and so far as it is possible to forecast the fate of any Bill before Parliament, the probabilities are definitely in favour of the powers sought being granted. In that case a precedent will have been established upon which the other groups of railways will, no doubt, take prompt action.

INDIVIDUAL VEHICLE RECORDS.

Recently we drew attention to the benefits that the motor vehicle user can derive by keeping accurate records of performance of each vehicle singly, and we now understand that a very serious concerted effort is to be made by leading manufacturers to encourage this practice. The manufacturer has nothing to gain by persuading the user to keep records, unless the results of so doing are such as to reflect credit upon the manufacturer's product. If the records merely show that, let us say, his costly vehicle lasts no longer than another firm's cheaper machine, and costs just as much to run, or if they show that his machine, while cheaper, costs vastly more to operate and wears out far more quickly, he is bound to be a loser. If, then, the manufacturer presses the users to keep

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MOTOR TRAFFIC

records, it is because he has confidence in the merits of his own products. Probably his difficulty has been that because his machines were good they were necessarily not low priced, and that he has lost business because people persist in buying in what appears to be the cheaper market without taking full account of operating costs as well as of first cost. Carefully kept records are of great value from many points of view, but their main value is that they provide fair comparative data as between different types and makes of vehicle, and thus help the user to buy intelligently and to the best advantage. We trust therefore that readers will not turn a deaf ear towards the representations made to them, and will go to the trouble of systematically keeping records of a type that really affords a fair basis of comparison of different vehicles, thereby enabling them to effect numerous economies by intelligent selection and subsequently by the rapid detection of faults, the presence of which is revealed by the consequent falling off in the performance of the machine affected.

EXTRAORDINARY TRAFFIC.

By the dismissal in the House of Lords on February 21 of the appeal of H. Butt and Company, Limited, in the action by Weston-super-Mare Urban Council for damage alleged to be done to the road by steam wagon and trailer traffic of extraordinary weight, the question of extraordinary traffic has been left in a very unsatisfactory position. After five years of litigation, entailing a cost of nearly £14,000, it has now been decided that until new legislation has been enacted vehicle owners who put traffic on the road in such volume as to cause excessive damage through extraordinary weight must be held liable for the cost of repairing roads. If the judgment implied no more than this the outlook might be regarded as definite, but there is another consideration to be taken into account. It would appear from the judgment that haulage contractors are not liable for the cost of strengthening the foundations of a road so as to make it suitable for new traffic. It appears, moreover, that where the weight, although heavy, and the volume, although great, does not exceed reasonable limits, and the speed is not excessive, the owner of a vehicle is justified in assuming that main roads are strong enough for such traffic. The difficulty will be to discriminate between ordinary traffic and extraordinary traffic. In the case of the former there can be no claim for damage, but at a certain point ordinary traffic may become extraordinary, and at that point the vehicle owner may become liable. In such circumstances inconsistent decisions may be given in the several courts. Thus the decision of the House of Lords cannot be regarded as satisfactory, either to the road authority or to the transport industry. The Motor Legislation Committee and other bodies interested will in the circumstances no doubt press for an alteration of the existing law.

RAILLESS CARS FOR LONDON.—The Court of Referees of the House of Commons have decided that a *prima facie* case has not been made out by Wandsworth Council against the scheme of the London County Council for a trolley omnibus line, and that their application to be heard against the Bill cannot be entertained.

LONDON GENERAL OMNIBUS COMPANY IN 1921.

LORD ASHFIELD'S REVIEW OF PROGRESS.

Presiding at the annual meeting of the London General Omnibus Company, Limited, held on February 23, Lord Ashfield, in the course of his remarks, said—Considerable progress has been made in the replacement of the pre-war type of omnibus by larger omnibuses of modern and improved design. By the close of the year, 926 "K" type omnibuses, each seating 46 passengers, and 205 "S" type, each seating 54 passengers, were brought into service by your company alone, and similar steps to reinstatement had been taken by the allied companies. The seating capacity of the active fleet at January 1, 1921, was 95,000, and at December 31, 1921, 114,000, an increase of 20 per cent. The experience obtained of the working of the "S" type has been good, and your company has felt justified in proceeding with orders for further substantial numbers, which it is expected will be added to the fleet during the first half of the current year. During the year the Central Overhaul Works at Chiswick have been opened. This has enabled the standard of maintenance to be made uniform throughout the whole fleet, and has added to its efficiency. It has also enabled the time taken for the overhaul of a vehicle to be reduced from 16 to four days, with the result that the fleet of omnibuses available for service upon the streets is greater by 3½ per cent. With the purchase of the additional omnibuses it will be necessary to provide further garage accommodation. The development of the services in the north-eastern and eastern quarters of London will particularly require additional garage accommodation.

TRAFFIC RESULTS FOR 1921.

The company works and maintains the omnibuses of the Gearless Omnibus Company and the Tramways (M.E.T.) Omnibus Company, which shared on a percentage basis. Your company has taken steps to acquire, as from January 1, 1922, the shares and undertakings of these companies so that there may be a further consolidation of interests. To summarise the principal feature of the year 1921, it has been a resumption of progress interrupted by the war, and the development of motor omnibus services to provide satisfactorily and fully for the whole of the Greater London area. The number of passengers carried by your company during the year has been 761,250,000, or 6,700,000 less than in the previous year. The decline is of recent occurrence, as owing to the abnormally fine weather of the summer of 1921 the traffics carried during those months exceeded our ordinary expectations. From the opening of April to the close of October there were only six week-ends when the weather was in any way unfavourable to pleasure riding. If the motor omnibus companies of London as a whole are considered, the total number of passengers carried during the year was 931,750,000, or approximately one-third of the whole local traffic movement in the Metropolitan area. This compares with 936,000,000 carried in the year 1920. The decline is slight, though I regret to say it is continuing. There seems to a general lack of money, which restricts the number of rides taken by the population, and until there is a restoration of prosperity among the inhabitants I am afraid we cannot look forward to an expanding traffic. It is necessary, therefore, for us to pursue a conservative policy.

FINANCIAL DETAILS.

Your company received as its share of the Common Fund £260,568, as against £113,437 in 1920, an increase of £147,131. The traffic receipts after the operation of the Common Fund amounted to, in round figures £7,501,000, as compared with £6,934,000 in the previous year, an increase of £567,000. Miscellaneous receipts amounted to £157,000, as against £132,000 in the previous year, an increase of £25,000, which may be attributed chiefly to advertising upon the motor omnibuses. The total receipts of your company, therefore, amounted to £7,684,000. The working expenses amounted to £6,936,000, leaving a net amount of £748,000 or £241,000 more than a year ago. After all the expenses and charges for the year have been met, the balance available for dividend on the ordinary shares is £319,411, an increase of £146,248 over that available in 1920. An interim dividend of 4½ per cent., free of income tax, was paid on the ordinary shares of the company in August last. This required £141,459, and leaves £177,952 still available. Your directors therefore recommend the payment of a final dividend of 3½ per cent. free of income tax, making for the year 8 per cent. free of tax. The accounts show that the expenses for the year 1921 are somewhat more than in 1920. The increase is 4 per cent. The mileage worked

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has increased from about 86 millions to 87 millions of miles, or by just over 1 per cent.

The revised fares which were brought into effect on September 26, 1920, continued in force until December 1, 1921. These revised fares met, as was expected, the financial requirements of the companies, and served to put transport upon a reasonably remunerative basis. On December 1, 1921, the London County Council decided to revert to the fares which had been in force upon its tramways prior to this revision, and in order to protect their own traffic the omnibus companies were compelled to adopt similar fares in the London County Council's area. Since this alteration in fares it is admitted that the London County Council have not gained. I see one estimate is given that the loss is £10,000 a week. Lord Ashfield also referred to the fact that in the session of 1920 the London County Council promoted a Bill for the acquisition of motor omnibus powers in London, and in particular they desired to have the power to run omnibuses upon short routes in the central area connecting the tramway systems north and south of the river. An undertaking was given before the House of Lords Committee on the hearing of the Bill that an attempt would be made by your company to co-operate with the London County Council in providing the motor omnibus services required, and in pursuance of this undertaking your officers met the officers of the London County Council and have carried out during the last year various experiments in the way of short services and through bookings to see just what the requirements of the traffic were. I can only repeat now the undertaking that was given before the House of Lords Committee, that if there is any traffic in London which requires motor omnibus facilities, then your company is able and willing to give those facilities, but I think you will agree that we should not be asked to give facilities which it is clear are not required. The loss to your company has amounted to £22,000 in the course of the year. The London County Council are promoting in this present session of Parliament a Bill for the construction of a short length of tramways through Amhurst Park near Finsbury Park, and a considerable cross-country route to be worked by railless traction in South-east London. Your company has lodged a petition to be heard before Parliament upon these proposals.

The report and accounts were adopted.

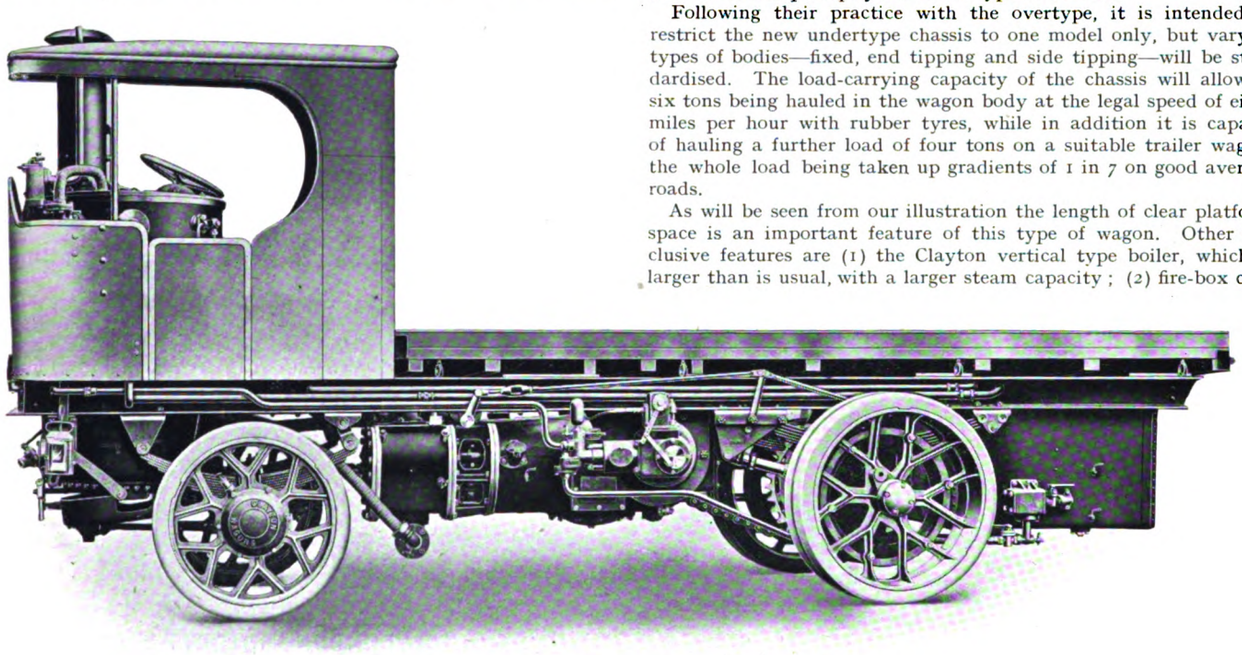
At a meeting of Edinburgh Town Council, Councillor C. J. Mancor, chairman of the Tramways Committee, moved approval of the committee's recommendation for the purchase of an additional motor car to be added to the municipal garage.

THE CLAYTON "UNDERTYPE" STEAM WAGON.

For many years the Clayton overtype steam wagon has enjoyed a reputation for efficiency and reliability that has fully justified the makers' decision to specialise in this particular type of machine. With the widening field of road transport, however, and the difficulties facing the use of petrol vehicles for heavy loads, Messrs. Clayton Wagons, Limited, came to the conclusion some time ago that the scope of the steamer would be materially extended, and in order to meet fully the anticipated demand, decided to depart from their previous practice and design an undertype machine. Owing to the exigencies of supply and demand, it was found impossible to plan the manufacture of the new type until the completion of the works extensions gave the necessary facilities. With these extensions the company's works at Lincoln now form the largest British factory exclusively devoted to the manufacture of steam wagons, and it is anticipated that they will now be in a position to fulfil orders promptly for either type of vehicle.

Following their practice with the overtype, it is intended to restrict the new undertype chassis to one model only, but varying types of bodies—fixed, end tipping and side tipping—will be standardised. The load-carrying capacity of the chassis will allow of six tons being hauled in the wagon body at the legal speed of eight miles per hour with rubber tyres, while in addition it is capable of hauling a further load of four tons on a suitable trailer wagon, the whole load being taken up gradients of 1 in 7 on good average roads.

As will be seen from our illustration the length of clear platform space is an important feature of this type of wagon. Other exclusive features are (1) the Clayton vertical type boiler, which is larger than is usual, with a larger steam capacity; (2) fire-box constructed to allow expansion without straining, the arrangement of the water tubes cross tubes; (3) engine having distance pieces between the cylinder and crank case, with the result that in the event of the glands leaking, that action does not deteriorate the oil, but is plainly visible, while the glands are easily accessible for adjustment; (4) reversing and cut-off control. Both cylinders are fitted with balanced piston valves, and this reversing action and increased power by cut-off are controlled through this medium by a lever near the driver's seat.



"Undertype" Steam Wagon which Messrs. Clayton have added to their "Overtype" Productions.

The following is a brief specification, together with principal dimensions—The boiler is the Clayton patent vertical type, constructed of Simens-Martin mild steel plates to withstand pressure up to 230 lb. per square inch. The engine is of the enclosed type, with cylinders 6¾ in. by 10 in., both this and the crank case being totally enclosed and arranged for automatic lubrication. The crank shaft is perfectly balanced, and runs on heavy gun-metal bearings. The main drive is a simple direct drive between the crank shaft and rear axle by means of a roller chain. The steering is of the Ackerman type of improved design, centred above the tyre, with extra large bearing, giving great wearing surface. The differential is enclosed in a cast-iron casing which forms a perfectly dust-proof oil bath. The wagon is mounted on long laminated springs to both front and rear axles, the wheels being cast-steel "Y" pattern, suitable for fitting either steel or rubber tyres. An internal expanding brake, "Ferodo" lined, acts upon both wheels

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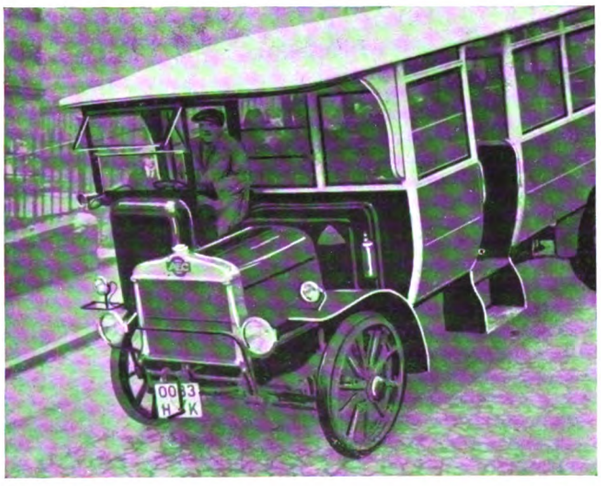
through the medium of rings bolted thereto. The total length of the wagon is 20 ft., the width over splashers being 6 ft. 8 in., and the wheel base 10 ft. The length of the standard platform, inside measurement, is 14 ft., and the width 6 ft. 6 in. The rear wheels are 3 ft. 6 in. by 10 in. wide, and the front wheels 2 ft. 10½ in. by 6 in. in width. The capacity of the water tank is 150 gallons, and that of the fuel bunker 4 to 5 cwt.

A.E.C. PROVINCIAL OMNIBUS.

An interesting demonstration of the hill-climbing capability of the new model 4 single-deck omnibus designed by the Associated Equipment Company for provincial operation was given during

38-Seat Provincial Type of A.E.C. Omnibus Engaged in Hill Tests at Glasgow.

the recent motor exhibition at Glasgow. In the subjoined photographs the vehicle is shown ascending and descending Scott Street hill, off Sauchiehall Street, which has a gradient of 1 in 3·8. The climb was performed from a standing start at the foot of the hill, the road being covered with a thin layer of snow at the time. The omnibus seats 38 passengers, and on this occasion 18 persons were



The Same Omnibus Descending Gradient.

conveyed, the vehicle mounting the hill with ease. It was then turned and driven down the incline, keeping a perfectly even track in spite of the bad surface. During the week of the show this test was repeated several times.

OMNIBUSES AND ROAD CHARGES.

QUESTION TO BE DISCUSSED WITH TRANSPORT MINISTRY.

At a meeting of the Association of Municipal Corporations the Law Committee, reporting on "Omnibuses—Road Adaptation Charges," stated that in a number of local Acts passed in recent years authorising Corporations to run omnibuses beyond the limits of their boroughs, provisions had been inserted, generally at the instance of County Councils, requiring contributions to be made—

(1) Towards the cost of maintaining roads over which the omnibuses are run; and
(2) Towards the cost of reconstructing and adapting those roads for the purpose.

In the Acts passed during the last session of Parliament, however, the obligation to contribute anything towards the cost of maintenance was omitted, and the obligation to contribute towards the cost of reconstruction or adaptation such an amount, if any, as might be agreed or determined by the Minister of Transport, was retained. By virtue of the Finance Act 1920, and of the Roads Act 1920, large sums have now to be paid annually into the Road Fund in respect of licences for mechanically propelled vehicles, that fund being applicable towards the construction of new roads and the maintenance and improvement of existing roads. In consequence, no doubt, of this provision, a section of the 1920 Roads Act enacts that "where any persons are, whether by virtue of any Act or otherwise, liable to pay any sums by way of mileage charges or other annual payments in respect of the use of any road by their vehicles, the Minister may, on an application by those persons in that behalf, and after considering any objections made by any person interested, suspend, modify, or determine the liability to make the payment, as he shall think fit." In view of these circumstances (the Law Committee continued) a further consideration of the matter is clearly desirable, and the Minister of Transport has been good enough to write the County Councils Association and the Association of Municipal Corporations to attend a meeting for the purpose of discussing the question.

The report was adopted, and representatives appointed to discuss the subject with the Minister of Transport.

The Crosville Motor Company, Chester, recently applied to the Ministry of Transport under the provisions of Section 10 of the Roads Act 1920, for the determination of their liability to pay mileage charges to the highway authorities concerned in respect of the use of certain roads by the company's omnibuses. The Ministry have decided that the liability shall be determined as regards the use of six roads in Chester.

ANNUAL LONDON MOTOR PARADE.

The sixteenth annual parade of commercial motor vehicles, organised by the Commercial Motor Users' Association with the object of encouraging drivers to take a personal interest in the driving and the condition of their vehicles, and to run them without accident, will take place in London on Saturday, March 25. The handsome silver challenge cup, first offered in 1910, will again be awarded to the owner whose "team," in the opinion of the judges' committee, is in the best condition, having regard to the class of work upon which the units are employed, the ages of the machines, and the total distance run by them. The driver of each vehicle in the winning team will be given a cash award and a silver medal. The drivers of each vehicle in the "runners up," and third, fourth, fifth, sixth and seventh teams will also receive a cash award, and drivers of each vehicle in the eighth, ninth, tenth, eleventh, and twelfth teams will be "highly commended."

PRODUCER FUEL.

Mr. Drummond Paton recently exhibited before the Mining Students' Association at Wigan Mining College a new form of smokeless fuel. From it the hydrogen compounds have been extracted, and it retains the maximum heat value of the original coal. Mr. Paton states that in London experiments are being made with this new fuel, a 3½-ton Leyland lorry using it having gone 100 miles with a 3½-ton load at a cost of 5s., compared with £3 which would be the cost of petrol for the same load and distance. The new fuel is gasified in a small producer on the lorry, the lorry thus producing and burning its own gas.

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HICKMAN LIGHT WEIGHT OMNIBUS.

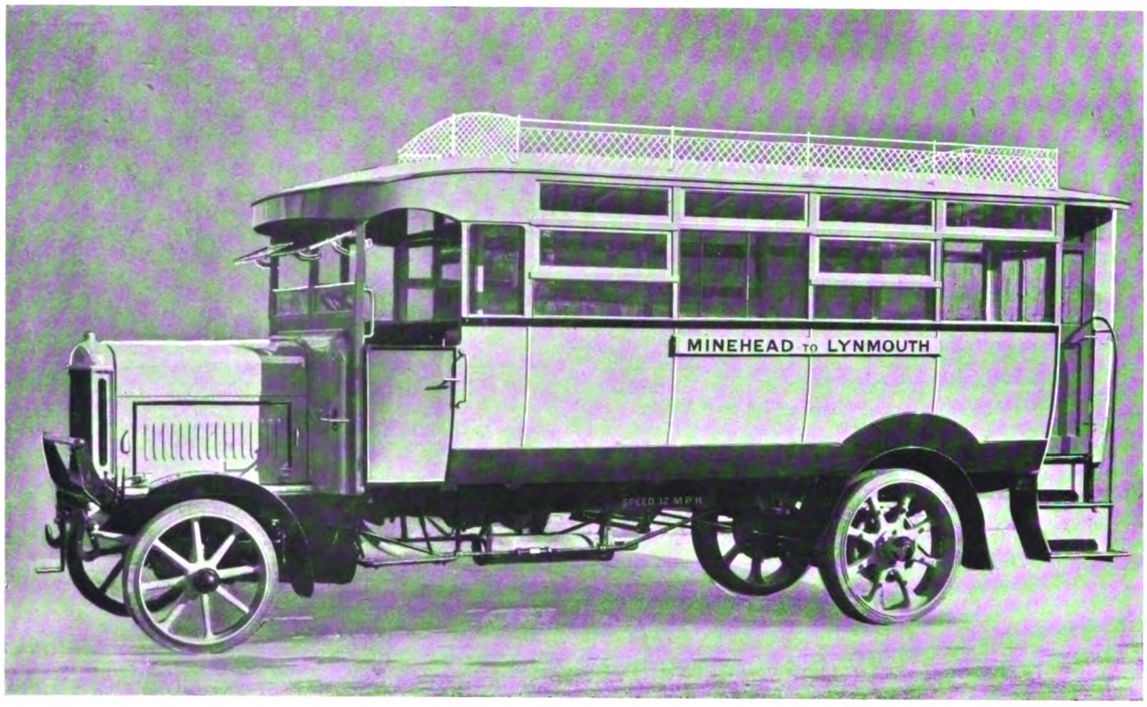
Our illustration shows one of the 36-seat single-deck omnibuses now being delivered by the Hickman Body Building Company, of Grove Road, Balham, for service in the West of England. In view of the exceptionally heavy gradients on the routes over which it is intended to maintain a regular service with these vehicles, it was essential that the dead weight should be kept down as low as possible consistent with the necessary strength to withstand the heavy duty of the service. The special form of construction under the "Hickman" patents whereby all joints are reinforced with light steel castings, enables much lighter timber scantlings to be used, while the joints between the cross members of the bottom frame and bottom sides are eliminated, thus rendering the usual heavy forgings superfluous.

The bottom member of the sides is placed on edge, and lapped to the pillars; it thus forms a continuous side member, which adds considerably to the longitudinal strength of the body. The important result of this form of construction is a substantial reduction in weight and a considerable increase in strength when compared with the usual type body, which frequently fails through the shrinkage of timber at the joints, thus permitting lateral and even longitudinal movement. The design of the body, as will be seen by the illustration, is most pleasing, and is specially suited for a country service. Ample protection is given for the driver and the passengers in front by means of the deep canopy bend and the plate-glass screen.

The bodies are panelled with steel, butt jointed on all pillars the joints being covered with aluminium moulding, so that any damaged panel can easily be removed and replaced. The interiors are lined with birch ply butted between all pillars, thus adding greatly to the strength of the body and increasing the available length and width to the maximum.

The seating arrangement provides for 28 seats facing forward, five with back to the driver, and three on the driver's seat. Each of these are fitted with spring cushions, upholstered in dark brown "Rexine" leather cloth. Ample ventilation is provided by means of eleven extra deep ventilating windows, five on each side and one in the front end, supplemented by four half windows.

The rear platform is supported by a specially designed light steel casting, and enclosed by a rounded panel well within the radius of the corner pillar, so as to insure freedom from contact with road obstructions or other vehicles. The recessed rear entrance is fitted with a half-glazed door, which when open lays flat with the end of the body, clear of all obstruction. A mahogany partition divides the body into smoking and non-smoking departments.



Hickman 36-Seat Omnibus Mounted on Leyland Chassis.

L.G.O.C. "SAFETY" RECORD.

The London General Omnibus Company, having analysed their returns of working for 1921, announce a remarkable improvement upon previous records of all round efficiency.

The year has shown a decrease of 10 per cent. in the gross total of accidents, and there has been a decrease of a fraction less than 60 per cent. in the number of fatal accidents. A period of 67 days, from September 27 to December 6, elapsed without any fatal accident being recorded. The significance of the improved safety record lies in the fact that it goes with a vastly increased mileage run by the omnibuses. In 1921 the company's omnibuses ran 1,200,000 miles more than in the previous year.

Taking mileage as the measure of "third party" accidents, the total average of accidents—including the merest casualty—works out at one for every 8,000 miles run. This is a decrease of 12 per cent. as compared with the 1920 record. The company have achieved a marked advance in efficiency in vehicular working. The mileage lost through breakdowns only represented one-third of a mile per 1,000 miles run in 1921. This figure by a long way surpasses all records.

THE COACHING SEASON.

As an indication of the enterprise likely to be shown by motor coach proprietors this season, it may be mentioned that Dennis Brothers, of Guildford, have received an order for 17 vehicles from one company. The London General Omnibus Company intend to develop their half-day and evening coach trips, with tea or supper at country inns.

Among provincial undertakings, the Torquay Tramways Company will continue, on an extended scale, their local and long-distance tours, the latter with hotel accommodation. Mr. H. J. Nisbett, the engineer and manager, regards the large coach as essential if the trips are to be run at low fares and earn a dividend, particularly when more than half of the yearly traffic is done in three months of the year. Mr. Nisbett anticipates that within a very short time the large coach will be fitted with pneumatic tyres.

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RAILWAYS AND ROAD TRANSPORT.

WITHDRAWAL OF APPLICATION FOR POWERS TO CARRY PASSENGERS.

March 2 was the date set down for the second reading in the House of Commons of the Bill of the North Western and Midland Group of Railways for powers to provide road transport services. Sixty-five public bodies, including municipal corporations, County Councils, Chambers of Commerce, motor organisations, and haulage companies had lodged petitions against the Bill.

Early in February the promoters addressed the following communication to the petitioners—

"The promoters of this Bill have decided not to proceed with the proposals to carry passengers, and in the hope that it may satisfy many of your clients who contemplate petitioning against the Bill, we hereby undertake, subject to the sanction of Parliament, to strike out of Clause 4 the words 'and passengers and their luggage.' Clause 12 will, of course, not be proceeded with, except possibly so far as it relates to the carriage of merchandise. The preamble and Clause 10 will also be amended, so as to conform with the limited scope of the Bill."

SIX MILLION TONS DIVERTED TO THE ROADS LAST YEAR.

On February 15 the railway companies issued a statement giving their case for seeking to convey goods traffic by road. In it they stated that the enormously increased use of the roads by mechanically propelled vehicles had opened up a new vista of transportation, and they contend that it is reasonable, not only in their own interests, but in the interests of the public generally, that they should be allowed to keep abreast of the times and to render the best service possible to the trading community.

The companies estimate that 6,000,000 tons of traffic, mainly consisting of the more valuable classes, were diverted from the railways to the roads last year. A considerable proportion of the traffic so diverted passes between places within a radius of 50 miles, but the competition by road motor vehicles is being very largely extended for longer distances, such as London and Birmingham (111 miles), Liverpool and Birmingham (88 miles), and Manchester and Birmingham (84 miles). Short-distance traffic, they urge, can be conveyed more cheaply and expeditiously by road throughout than by carting it to railway depots, loading up, conveying it by railway, and unloading and carting from the destination station to the premises of the consignee. In such cases wagon mileage is saved to the companies, and more trucks are available for longer distance traffic. The companies are able to economise engine power and better facilities can be given to the traders by relieving congestion at stations and depots.

The promoters, if road powers are granted them, do not propose to invade the territory served by any other railway company, or group of railway companies. As trade revives and traffic increases, portons of the railway systems will be seriously congested, and it is the view of the railway companies that, if they are granted road motor powers, the threatened congestion will be relieved without the necessity for incurring large capital expenditure, which in the present state of finance presents grave difficulties. Although the railway companies in respect of road charges will always be subject to the control of the Rates Tribunal, there is nothing to prevent the independent road carrier underquoting the railway companies if their resources enable them to do so.

MEETING WITH THE MOTOR LEGISLATION COMMITTEE.

Representatives of the railway companies attended a meeting of the Motor Legislation Committee under the presidency of Sir W. Joynson-Hicks. They explained the objects of the Bill, and emphasised the withdrawal of the clauses relating to passenger transport by road. Meetings of railway employees have passed resolutions in favour of the measure, and Mr. J. H. Thomas, M.P., of the National Union of Railwaymen, and one of the sponsors of the Bill, has stated the reasons why he supported the proposal. His statement evoked a reply from Mr. J. F. Shaw, managing director of the Road Transport Clearing Houses, Limited, who observed that in view of the fact that 90 per cent. of available traffic is not suitable for road transport, it is very doubtful if ten per cent. can be diverted to the roads. He also pointed out the dangers to the community of the workers in all forms of transport being in the hands of members of one amalgamated union, which, he understood, was probable with the existing Transport Workers' Union and the N.U.R.

At a special general meeting of the London and North-Western Railway Company at Euston, on February 28, approval was given to the Bill.

The Chairman (Mr. C. Napier Lawrence) said it must obviously be reasonable that all railway companies should possess powers of road transport. During the State control of railways considerable diversions of traffic from the railways to the roads occurred, and it was estimated that 6,000,000 tons of traffic, mainly consisting of the more valuable classes, were so diverted in 1921. This was part of the very traffic which the railways were built to accommodate, and the companies had abundant justification for seeking the necessary powers to retain or recover the traffic that had been diverted from them. It was a fallacious view on the part of opponents of these proposals that these powers should not be granted because railway companies ought to be restricted to what was called their proper business of transport by rail. To show how ready and willing the railway companies were to meet all legitimate criticism, the chairman said that, in deference to a considerable body of opinion, an undertaking had been given to abandon the powers to carry passenger traffic by road.

FURTHER CONCESSIONS BY RAILWAY COMPANIES.

The North-Western and Midland Railway group, in a statement made on March 13, notified further concessions to meet opponents' objections. They stated that the main objection appears to be that although the railway companies will be required to submit a schedule of standard charges to be approved by the Railway Rates Tribunal, they will still be free to quote exceptional rates below the standard charges, and that such latitude will enable them to compete with other existing road carriers to extinguish ultimately such competition and thereafter increase the rates. The railway companies have no desire to compete unfairly with existing road carriers. All they desire is an equal right with any other industrial organisation to develop such modern methods as are in the interest of their customers and themselves, and the only latitude they desire in the matter of charges is that already conceded in respect of railway rates. All exceptional rates must be reported to the Minister of Transport, and he may refer to the Rates Tribunal if, in his opinion, they are likely to prejudice the interests of any class of users not benefited by the rates in question or to jeopardise the standard revenue which the railway companies are required to earn. As an additional safeguard the railway companies are prepared to insert in the Bill a clause whereby road transport interests will have the same right as is granted to shipping and canal interests to appeal to the Minister of Transport and thereafter to the Rates Tribunal if it can be shown that the railway companies are charging exceptional rates which are detrimental to the public interest or inadequate having regard to the services in respect of which such rates are charged.

To safeguard themselves from being required to maintain services which are not profitable, the railway companies are prepared to insert further a clause in the Bill to the effect that the rates charged for road transport services shall be such as will produce a net revenue sufficient adequately to remunerate the capital employed in operating the road services. Further, to define their responsibilities in connection with the establishment of road services, the companies are willing to insert a clause providing that the Railway Commissioners shall have power to require the continuance of a road transport service instituted by the railway companies unless it can be proved that such service is unprofitable or is not required in the public interest.

In a recent interview, Mr. Arthur Watson, general manager of the London and North Western Railway, said that between 1913 and to-day the turnover from rail to road had been so gradual that what was virtually a revolution in transport had been achieved without the public being aware that anything particular had happened. In 1913 there were 16,700 heavy vehicles on the road, while last year there were 120,000 licensed goods motors. Each goods motor might be assumed to run 30,000 ton-miles a year, and an annual licence fee of £30 on each vehicle worked out at less than a farthing a ton-mile, while each of them might damage a road to the tune of 6s. a mile. The ratepayer footed the bill, and railway companies were very substantial contributors to local rates. Last year the principal railway companies paid in local rates £9,608,483; that is to say, while they themselves are denied road rights, they are compelled to subsidise rivals by whom last year alone six million tons of goods were diverted from the railways. They were hopeful that Parliament would adjust matters by granting road rights to the North Western and Midland group.

Tramways, we might add, have long suffered from similar injustice. They maintain a large portion of road surface in which their tracks are laid for the benefit of all comers, including railways and omnibus companies.

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MOTOR VEHICLES FOR MUNICIPALITIES.

GLASGOW TRAMWAYS COMMITTEE have purchased a 3-ton Albion lorry.

LEEDS CLEANSING COMMITTEE have ordered a Lacre motor road sweeper at £650.

BRADFORD BOARD OF GUARDIANS have been recommended to purchase a Calcott coupé car at a cost of £595.

MIDDLESBROUGH CORPORATION are purchasing two motor vans to replace horsed vans used for refuse collection.

JOHANNESBURG COUNCIL have accepted the tender of Colonial Motors, Limited, for one Guy motor chassis for £600.

SALFORD CORPORATION propose to borrow £4,180 to cover the cost of the erection of a motor garage and repair shop.

HACKNEY BOROUGH COUNCIL have received sanction to raise a loan of £7,750 in respect of five 6-ton motor vehicles.

KENDAL HEALTH COMMITTEE have appointed a sub-committee to consider the advisability of purchasing a motor ambulance.

CAMBRIDGE HIGHWAYS COMMITTEE have decided in next year's estimates to provide for the purchase of two or three electric vehicles.

STAFFORDSHIRE STANDING JOINT COMMITTEE have decided to provide 18 motor vehicles for the use of the police. The estimated cost is £5,400.

HESTON AND ISLEWORTH URBAN COUNCIL are recommended by the Health Committee to purchase an 8-H.P. Rover motor car for £220, for the medical officer.

BRIGHTON TOWN COUNCIL have granted the Chief Constable £100 a year towards the upkeep and maintenance of a car to be provided by him for use in supervising the police.

LEEDS FIRE BRIGADE COMMITTEE have purchased a motor lorry for £900 from Leyland Motors, Limited. The Watch Committee have authorised the purchase of a motor ambulance.

CALCUTTA MUNICIPAL COUNCIL have decided to purchase two end tipping bodies, one being for a Thornycroft lorry. The tender of Messrs. McKenzie and Company has been accepted for the supply of a Leyland gully cleansing machine fitted with appliances for road watering.

BURNLEY CLEANSING COMMITTEE have received a report on the saving effected through the use of Karrier motor sweeper during the past six months. The superintendent also reported receipt of a letter from Karrier Motors, Limited, intimating that they expected shortly to make their street sweepers more efficient, and that in accordance with their agreement with the Corporation they were prepared to fit the machine with the new gear.

ISLINGTON BOROUGH COUNCIL have reduced the rates by 1s. 4d. in the £. This has been made possible by, amongst other economies, the saving of 4s. a ton in the cost of refuse collection and street cleansing effected by the use of electrically operated vehicles in place of horse traction. The actual saving on these services amounts to £14,000 per annum. The fleet of vehicles now in use are Edison battery machines supplied by Electricars, Limited, an illustrated description of which appeared in our issue of January 19.

OMNIBUS SERVICES.

BIRKENHEAD.—The Corporation propose to acquire land at a cost of £400 for the purpose of a motor omnibus station at Marston.

BIRMINGHAM.—The Tramways Committee, with a view to improving the omnibus services, have agreed to give a trial on the Harborne route to the A.E.C. "K" type as used in London. This type seats 54 passengers, as compared with 34 accommodated in the present vehicle. On March 6 the 4d. fare on the omnibuses was reduced by a halfpenny, and the higher fares by one penny. The 2d. fare has not been altered, as the Harborne and Moseley routes cross the tramways at Five Ways, and passengers for Five Ways might make greater use of the omnibuses to the inconvenience of the Harborne and Moseley omnibus passengers.

BLACKBURN-CLITHEROE.—The London and North-Western Railway Company propose to erect four halts on the line between Blackburn and Clitheroe, and to run trains of two steam cars in order to compete with the omnibus traffic. The district is regarded as the pleasure ground of Blackburn and East Lancashire towns.

BLACKPOOL.—As the Corporation have rejected the proposal for municipal omnibus services, the Tramways Committee have suggested that licences should be granted to those who will agree to terminate services at the end of three years without compensation.

BRIGHTON.—The Council have granted licences for ten additional omnibuses, but the vehicles are not to be used in competition with the Corporation's tramways.

BURNLEY.—The Tramways Committee have asked a sub-committee to report as to the desirability of instituting omnibus services in connection with the tramways.

ESSEX.—The Commissioner of Police has drawn the attention of Walthamstow Urban Council to the danger to omnibus traffic owing to trees in some roads projecting beyond the edges of the kerbs. The Council have directed the surveyor to remedy the cause of complaint.

HULL.—The Ministry of Transport have sanctioned a loan by the Corporation of £10,000 for the purchase of six omnibuses to be operated by the tramways department. The repayment period is fixed at six years. The six months' working of the Stoneferry omnibus service shows a loss of £413. The operating cost averaged about 16d. per omnibus mile.

KENT.—Sevenoaks Urban Council have asked the L.G.O.C. and other companies to request their drivers to go slowly through the town, as complaints have been received of vibration.

LEEDS.—The Tramways Committee have decided to purchase two small motor omnibuses to be used in linking up Farnley with the Tong Road and Kirkstall tramway routes.

LONDON.—The County Council have, at the request of Islington and St. Pancras Councils, made application to the Minister of Transport under Section 7 (4) of the Roads Act 1920, with a view to the issue, after holding an inquiry, of an order prohibiting omnibus traffic along the route proposed by the L.G.O.C. from King's Cross to Highgate via York Road, Brecknock Road, Junction Road, and Highgate Hill, on the ground of the unsuitability of a part of the route for such traffic. The L.G.O.C. recently inaugurated a service over the route from West Norwood to Catford upon which the London County Council propose to operate railless trolley vehicles. Included in the route are two steep hills, one being among the most severe gradients in London. The company intend to oppose the County Council's Bill. Lewisham Borough Council have reported that the new omnibus route is objectionable, inasmuch as the service will be over roads in their district which are unsuitable. The Council are also opposing the County Council's scheme.

MIDDLESEX.—Willesden Urban Council have informed the L.G.O.C. that the company will be held liable for any extra expense incurred in the maintenance of highways used by a new service from Willesden to Neasden, as the Council consider the roads to be unsuitable for omnibus traffic. In a reply to the Council's letter, the company state that the license duties on their vehicles have been substantially increased for the purpose of highway construction and reconstruction, and they decline to accept any further responsibility in the matter, but suggest that the Council should make representations to the Ministry of Transport with a view to that authority making a contribution towards the cost of maintenance.

PRESTON.—The Ministry of Transport have sanctioned the raising of a loan by Preston Corporation of £4,765 for the purchase of motor omnibuses, to be repaid in six years.

SCOTLAND.—The Scottish Commercial Motor Users' Association have lodged petitions in opposition to the following Provisional Order applications—Railways (West Scottish) group; Aberdeen Corporation, Glasgow Corporation, and Ayr Burgh. Each application is for powers to run motor omnibuses, the three local authorities asking to run beyond their boundaries. The Association in each case urges that there is no public demand for omnibuses along the routes proposed which is not met or capable of being met by local traders, and that is it improper to institute municipal services in competition with existing and prospective services provided by private enterprise.

SURREY.—The London General Omnibus Company have opened a new garage at Kingston-on-Thames. This town has become a terminus for country omnibus routes, and the new garage is devoted exclusively to rural traffic requirements. The services link the numerous villages in the Thames valley with Kingston, a market town, by means of regular communication with Woking, Shepperton, and Chertsey. These more convenient services attract a considerable traffic from the railways.

TAUNTON.—By twelve votes to seven the Corporation have decided not to purchase the undertaking of the Taunton Electric Traction Company, which has a route length of about two miles. The company ceased operation in May last. The Corporation intend to endeavour to provide a service of omnibuses by private enterprise, and to secure the removal of the tramway track.

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MOTOR TRAFFIC

MOTOR TRAFFIC NOTES.

FISH TRAFFIC BY ROAD.—Since the first week in March fish has been despatched by road motor vehicles from Aberdeen to Glasgow. The cost per ton by road is about 28s., against 74s. by passenger train and 56s. by goods train.

ROAD RESTORATION IN IRELAND.—The Irish Provisional Government are making a grant of £300,000 for road restoration. During the last few years military lorry traffic had cut up the roads, and the I.R.A. had "trenched" them and destroyed bridges.

COMPULSORY MUDGUARDS.—Smethwick Watch Committee recommend that, in view of the fact that there are now several types of efficient mud splash guards available, the Government should be asked to introduce legislation making the attachment of such guards to heavy motor vehicles compulsory.

DIRECTION SIGNS TO RELIEVE CONGESTION.—Manchester Corporation have asked the city engineer and chief constable, after conference with the Ministry of Transport, to prepare a scheme for the erection of road direction signs with a view to relieving the density of traffic in the centre of the city.

LACK OF CAR ACCOMMODATION IN BRISTOL.—By a large majority the Bristol Corporation have rejected a motion that the Watch Committee be asked to select a few sites in the centre of the city and in the suburbs where motor cars might be left unattended; also to consider the question of providing a covered motor park where cars could be left.

OLYMPIA TO BE ENLARGED.—Following representations made by the Society of Motor Manufacturers and Traders, the directors of Olympia, to meet the requirements of the motor and other large trade exhibitions, have made arrangements to build a new hall on similar lines, connecting up with the present building, and having an entrance in Hammersmith main road.

LONDON MOTOR FIRE APPLIANCES.—During 1921 the London Fire Brigade was entirely converted to motor traction. There are 79 motor escape vans, 87 engines, 13 tenders and lorries, 15 cars, 10 hose carts and ladder trucks, 4 fire floats. The abolition of horses has enabled several fire stations to be closed and the staff to be reduced. There are now 1,913 officers and men.

COMPETITION WITH SCOTCH RAILWAYS.—Aberdeen District Committee of the County Council on February 20 authorised an excess expenditure of £2,000 for the upkeep of roads. A member stated that the traffic was "getting something terrible" on the roads, and that the poor returns of the Great North of Scotland Railway showed the major portion of the traffic was on the roads.

SHEFFIELD PRIZE TO OMNIBUS DRIVER.—Mr. A. R. Fearnley, general manager of Sheffield Corporation Tramways and Motors, having reported that omnibus driver A. Dunham has for the last four months of 1921 occupied the premier position in economy of petrol consumption, the Tramways Committee decided to make a grant of two guineas to show their appreciation of the economical way in which he performs his duties.

FORBIDDEN ROADS.—Since the Hampshire County Council made their original proposals for closing narrow roads to coach traffic, the subject has been further investigated, and negotiations have taken place between the authorities and the coach proprietors. The result is that the original applications have been modified to an extent which the County Council hope will avoid any serious objection. The revised schedule includes 40 miles of roads deemed unsuitable for the traffic.

INCREASE OF MOTOR VEHICLES IN BIRMINGHAM.—Up to the end of January licences had been issued for 14,993 vehicles in Birmingham, as compared with 11,982 at the same date in 1921. Included in the present total are 4,459 private cars; 3,469 commercial and industrial vehicles; 590 taxi-cabs, omnibuses and coaches; 612 tramway-cars (a slight decrease); 209 private horsed carriages; 31 horse-drawn hackney carriages; and 5,172 motor cycles. The total revenue received is about £150,000.

OMNIBUS AND TRAMWAY RIVALRY.—There is no abatement in the battle between the Potteries Electric Traction Company and various proprietors of omnibuses and coaches. On several routes the tramway fare has been reduced in order to secure traffic attracted to the competing undertakings. The speed of the cars has also been increased. In the event of the reduced fares causing them to abandon their competition, the owners of the road vehicles intend to attack the company on routes where fares have not been lowered.

POLICE CONTROL OF TRAFFIC.—H.M. Inspector of Constabulary, in his report for 1921, attributes the fluctuations on the authorised strength of police forces to the increasing need, especially in large towns, for the regulation of traffic. The introduction of mechanical transport, he says, "has not only increased the need where it existed, but has created it elsewhere. The demand for control increases, not only in the interest of public safety, but for the purpose of trying to make the roads accommodate a traffic for which they are daily more inadequate."

ROAD TRANSPORT COMPETITION WITH RAILWAYS.—In support of an application made on February 21 to the Rates Advisory Committee of the Ministry of Transport for reduced rates for the chilled meat trade, it was stated that the trade was finding road transport much cheaper and more effective than the railway facilities. The committee decided that a sufficient case had not been made out for altering the present rates. The committee reduced the rates for cheaper grades of meat offals and for cider apples. They decided, however, that the companies' proposals for hay and straw should stand.

SUCCESSFUL RIVALRY WITH A RAILWAY OMNIBUS.—After nearly fifteen years' service, the Great North of Scotland Railway Company on February 28 withdrew their passenger omnibus between Newburgh and Aberdeen. The withdrawal is due to the competition of an omnibus run by two ex-service men, who began operations in August last with a 12-passenger vehicle against the 20-passenger machine of the company. They charged a return fare of 4s.—2s. less than that demanded by the company. At one time the company kept two vehicles employed. The company are continuing their goods service by road.

INDIA'S MOTOR IMPORTS.—Imports into India of motor lorries and trucks show a considerable increase from 1,229, valued at £483,509, in 1919-20, to 2,947, valued at £2,234,318 in 1920-21. In the former year the United Kingdom only supplied 197 lorries, of a value of £158,424, whereas the United States shipped 936 trucks, valued at £269,534. During 1920-21 the number of cars imported was 15,432, as compared with 9,525 in 1919-20. Of the 15,432, 10,120 came from the United States, 2,541 from the United Kingdom, 192 from France, and 2,579 from other countries, the figures for 1919-20 being—United States, 9,353; United Kingdom, 448; France, 3; and other countries, 121.

G.W.R. SUPERINTENDENT OF ROAD TRANSPORT.—Mr. F. C. A. Coventry, who since 1904 has had charge of the road and rail motor services of the Great Western Railway, has been appointed superintendent of road transport. Mr. Coventry began his career as a pupil in the locomotive department at Swindon in 1893, and subsequently served as inspector of materials and assistant to the carriage works manager. He also visited the United States on a tour of inspection. During the war he was attached to the Ministry of Munitions, where he had control over the transport of munitions and the lay-out of various factories all over the country. For his valuable work he was decorated with the Order of the British Empire. In 1919 he was appointed assistant superintendent of the line.

DEVICE TO PREVENT THEFT OF MOTOR VEHICLES.—Mr. J. Blackey, of St. James Street, Paisley, has invented a locking and starting device for the purpose of preventing the theft of cars. Attached to the dashboard, it consists of a contrivance with a number of sockets with plugs to fit, the whole connected with the magneto through the engine. When these plugs are inserted into the sockets in a certain arranged order the car may be started. When the plugs are withdrawn the car remains stationary, and no movement is possible until someone with the requisite code knowledge re-inserts them. No mechanic, however skilled, can set the vehicle in motion unless he holds the secret. The same device may be fitted to all classes of motors, but no two will start in the same way unless by pre-arrangement.

HEAVY VEHICLE LICENCES.—In calling attention to road damage by heavy motor vehicles and omnibuses, the Durham county surveyor refers to the "inadequacy of the contribution of these vehicles towards road maintenance under the present licensing regulations." This, he says, particularly applies to the heavy commercial vehicle. Based on the approximate average journeys and carrying capacity of these vehicles, the present taxation may be taken as about 1d. per car-mile for the omnibuses and ¾d. per vehicle mile, or ¼d. per useful load ton-mile for the commercial vehicle. He suggests that the County Council should consider the advisability of making strong representation to the Government that these licence duties are inadequate, and suggesting very material increases, especially as regards the heavy commercial vehicle.

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LONDON, MARCH 18, 1922.

EXCESS PASSENGERS.

The question of whether excess passengers shall be allowed to stand in tramcars and omnibuses in the London area is again receiving the attention of the Commissioner of Police. It will be remembered that in August last the Commissioner announced his intention of insisting after October 1 upon observance of the statutory provision that no excess passengers shall be allowed. After hearing the views of the operating authorities concerned, the Commissioner decided to postpone enforcement of his order for six months to allow, it was understood, of the provision of sufficient vehicles to meet the needs of the travelling public. In view of the approaching end of this period of grace, the London General Omnibus Company and the managements of some of the Metropolitan tramway undertakings have applied to the Commissioner for an extension of this period, and if the public interest is considered it will certainly be granted. It is not denied that the number of omnibuses and tramcars on the streets is constantly being increased to meet the heavy demands now made upon them; on the contrary, both the omnibus company and the various tramway managements have given practical evidence of their intention to bring the size of their respective fleets into line with the requirements. During the year 1921 the seating capacity of the London General Omnibus Company's fleet increased by 20 per cent., while the delivery of the 125 new cars of the London County Council has been proceeding for some time. It cannot be urged, therefore, that those primarily responsible for providing street transport facilities are guilty of attempting to carry on with an inadequate number of vehicles. Their desire for a continuance of the permission to carry excess passengers must be attributed to the fact that this is at present essential if all who wish to travel are to be accommodated. Overcrowding is not a state of affairs which prevails throughout the whole day; it is confined to the "rush" periods—approximately one and a half hours in the morning and two hours in the evening, in addition to certain other times when traffic in particular districts is especially heavy, notably after the theatres close. At these times more persons wish to travel than can be seated in the available cars and omnibuses. No transport undertaking can be expected to put on an additional fleet of vehicles for these hours only each day under present working conditions, though the General Omnibus Company have certainly made a courageous attempt to cope with the late theatre traffic. As was pointed out by the deputation of managers who interviewed the Police Commissioner last autumn, tramways could only hope to tackle this daily rush-hour traffic, with seats for everyone, at an enormous additional cost in the provision of extra power cables and sub-stations. The passenger-carrying undertakings of London have no desire to exercise any more standing facilities than are absolutely necessary, and as far as the average passenger is concerned his main anxiety is to accomplish his journey as quickly as possible—either seated or, if must be, standing. The public are aware of what the omnibus and tramway undertakings are doing for them, and they are not likely to complain of meagre treatment. After all, it is the passenger whose wishes must ultimately be met, and in this instance there is no doubt what those wishes are.

NEWCASTLE TRAMWAY STRIKE.

THIRD WEEK BRINGS NO SETTLEMENT.

The strike of Newcastle-on-Tyne Corporation tramway employees which commenced on Monday, February 27, continued this week, the men still declining acceptance of the 48-hour working week to which the Transport and Electricity Committee have decided to revert. No service whatever has therefore been conducted by the Corporation. A suggestion was made to the officials of the men's union that a plebiscite of the ratepayers should be taken on the question whether the men should retain their 44-hour week or accept the 48-hour week provided for in the National Agreement. The men approved of the suggestion and the proposal for a plebiscite was brought before the Corporation Tramways Sub-Committee. In view, however, of the fact that no power is vested in a municipal tramways authority to adopt such a course (except in connection with Parliamentary Bills) the sub-committee decided that they could not recommend the Transport and Electricity Committee to accept the suggestion.

The temporary service of private motor omnibuses and motor coaches increases daily and a large number are now in use. The tramway employees have refused to hand in their uniforms, contending that such action would terminate their agreement with the Corporation.

Commenting on the situation, the *Newcastle Daily Journal* says:—"Nothing is more certain than that the ratepayers are against the strikers, who are demanding better terms than their fellows in other cities, without any warrant, and whose position is indefensible. The sooner the tramwaymen realise this and the futility of continuing a strike which was never justified, and should never have been declared, the better it will be for themselves, as well as the city generally."

LIVERPOOL TRAMWAY FARES INQUIRY.

Liverpool Corporation made an application to the Tramway Charges Advisory Committee at the Ministry of Transport on Tuesday, to be allowed, under the Acts of 1918 and 1920, to continue until February 15, 1923, charges not exceeding those at present operative on the undertaking in the City of Liverpool, the borough of Bootle, and the urban district of Litherland, and in respect of the tramway or light railway between Liverpool and Prescot.

Mr. F. W. Pierce, Deputy Town Clerk of Liverpool, accompanied by Messrs. Frank Wilson (chairman of the Tramways and Electricity Committee), P. Priestly (tramways manager), and R. Barrow (City treasurer) were present on behalf of the Corporation. Bootle Borough Council opposed the application, and Litherland forwarded a letter saying that the increased fares were a great hardship, and pleading for the restoration of the penny ticket.

Mr. Pierce said notwithstanding certain increased fares in 1920 the expenses were £1,490,625, and the revenue £1,457,549, leaving a deficit of £33,076, and in addition the whole of the reserve fund had been exhausted. The fares were increased by statute in 1921. The deficiency in that year was not so great as was expected. Expenses were £1,607,542, revenue £1,558,906, and the deficiency £48,636. Mr. Priestly said the expenses of the system had risen 239 per cent. since 1913, but fares had only increased 38 per cent. Mr. Wilson said a return to the old fares would mean a loss of £300,000 a year. Mr. Tumilty said Bootle, with its labouring population, wanted a return to the penny fare for short stages. (The present minimum fare in Liverpool is 2d.)

Loss on the East Ham Tramways.—A loss of £17,000 is reported on the East Ham Corporation tramways for the nine months ended December 31, 1921.

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PRINCES STREET, EDINBURGH.

TRANSPORT MINISTRY AND FORTHCOMING INQUIRY.

In the House of Commons on Thursday Captain W. Benn asked the Parliamentary Secretary to the Ministry of Transport whether the Ministry had decided to hold an inquiry into the form of traction to be adopted by the tramway committee of Edinburgh Town Council, with special reference to Princes Street; and, if so, what was the scope of the inquiry and its estimated cost?

Mr. A. Neal: Yes, Sir. The inquiry will be conducted by Sir William Marwood and Colonel Pringle, who will endeavour to elicit such information as may be necessary to enable a correct decision to be arrived at, but they will discourage any discursive discussion upon general questions. The public expense involved cannot be large. I cannot control the expense which the corporation or others may determine to incur, but I deprecate and regard as unnecessary any substantial outlay.

Mr. W. Graham: Would the hon. gentleman exclude from this inquiry the question of amenity, which obviously is a matter for the Corporation of Edinburgh and not for any Committee?—Mr. Neal: I think the method of inquiry adopted is generally unsatisfactory, but the two officers who will conduct the inquiry are experienced men and they will try to keep it within reasonable limits. Mr. Neal added that the inquiry would be held in Edinburgh.

On Tuesday Mr. A. Neal, Parliamentary Secretary to the Ministry of Transport, received representatives of Edinburgh Corporation, who discussed with him the electrification of the tramways, with special reference to the forthcoming inquiry concerning Princes Street.

L.C.C. TRAMWAY MATTERS.

The first meeting of the newly-elected London County Council was held on Tuesday, when Mr. F. R. Anderton was elected chairman, and Mr. H. C. Gooch vice-chairman.

EXPENSES OF CANDIDATES FOR APPOINTMENTS.

The General Purposes Committee recommended that standing order No. 311 should be amended, so that candidates for employment who are required to attend at the offices of the Council or elsewhere in support of their applications, should be allowed third-class railway fares. If a candidate was kept in London overnight at the request of a committee, a subsistence allowance of 12s. 6d. a day should be authorised. At present first-class railway fares are allowed when the appointment is to be made at a salary of not less than £800 a year, and in addition, cab fares and hotel expenses are paid.

STORES DEPARTMENT—PURCHASE OF MOTOR CARS.

The Special Committee on Organisation of the Council's Service suggested that economy would be secured by the provision of two additional motor cars for use in the stores department. They proposed that the second of the cars, which is required mainly for the use of the chief and second officers of the stores department, should not be obtained until experience had been gained.

NEW TRAMWAY REGULATIONS.

The Highways Committee submitted certain recommendations as to regulations governing the services under their direction, to conform with the new procedure adopted by the Council. They recommended:—

(a) That rewards as may be prescribed be given to the Council's tramways employees (i) for information leading to the detection and conviction of any person who damages, or steals articles from, the Council's cars or other property; and (ii) for meritorious conduct.

(b) That children under five years of age be carried free on the Council's tramcars, provided that each child be accompanied by a fare-paying passenger, and does not occupy a seat to the exclusion of a fare-paying passenger; and that children under 14 years of age be charged such special fares as may be prescribed.

(c) That such special fares as may be prescribed be charged on the Council's tramways to school children (and the adults accompanying them) visiting medical treatment centres on days other than Saturdays, Sundays and public holidays.

(d) That, subject to the exigencies of the service permitting in each individual case the adoption of such a course, facilities for extra leave without pay be afforded to employees in the tramways department who are members of the St. John Ambulance Brigade, to enable them to attend annual training with the Royal Naval Sick Berth Reserve, on the understanding that such extra leave is not in any sense to be regarded as a right, but may be withheld by the Council at any time, that it shall not exceed one week a year, and that the employees granted such leave be allowed 2s. 6d. in respect of each day on which they attend, provided that the expenditure under this regulation shall not exceed £100 in any one year.

(e) That at those tramway depots or buildings in which accidents are likely to occur, corps be established among the employees with a view to first-aid treatment being rendered; that all members of the corps be required to possess a certificate for first-aid granted by the St. John Ambulance Brigade or an equivalent certificate; and that an allowance of 7s. 6d. a quarter be made to each member of the corps, provided that the general manager, tramways department, be satisfied that such member continues to be able to render efficient treatment.

(f) That when apprentices are engaged in the tramways department the proportion shall not exceed one apprentice to five of the mechanics then employed.

(g) That the scheme of apprenticeship in the tramways department be as follows:—

(i) Apprentices may be engaged in the tramways department between the ages of 15 and 17 years for a period of not more than five years or less than four years of 2,300 working hours each year.

(ii) The wages of apprentices shall be in accordance with such scales of pay as may be prescribed from time to time.

(iii) Apprentices over 18 years of age when working overtime shall be paid the usual overtime rates obtaining in the district; the time so worked shall be reckoned as working hours.

(iv) No apprentice less than 18 years of age shall work after 2 p.m. on Saturday or 6 p.m. on any other working day.

(v) The hours during which apprentices (up to the age of 18 years) employed in the tramways department are required, without loss of pay, to attend classes for technical education, shall be eight hours a week.

(vi) Pay in respect of absence owing to illness or other incapacity to work may be granted to apprentices at the discretion of the general manager, tramways department, and any other conditions under which they may work shall be in accordance with such rules as may be prescribed.

The Committee will later submit proposals dealing with the holidays of employees in the tramways department.

THE FOUNDATION COMPANY, LTD.

An interesting development in the engineering and electrical field is the formation of the Foundation Co., Ltd., which will carry on business as engineers and contractors with offices at 83, Kingsway, London, W.C.2. Mr. Walter Rutherford is managing director, and the other members of the board are as follows:—Mr. A. W. Tait, C.B.E. (chairman), Mr. Franklin Remington, U.S.A. (deputy chairman), Lt.-Col. Fred W. Abbot, Sir Charles Davidson, and Mr. John Doty. The staff organisation includes:—Engineer-in-chief, Mr. John W. Doty, C.E., M.Am.Soc.C.E.; general manager and chief engineer, Mr. H. E. Midgley, M.A. (Cantab.), M.Inst.C.E., M.Inst.E.E., M.I.Mech.E.; commercial manager (home), Mr. Douglas Kerr, M.A. (Cantab); commercial manager (export), Mr. A. A. Vanneck; estimating engineer, Mr. H. W. Kimber, M.I.Mech.E.; abstract engineer, Mr. A. Paterson, M.I.Mech.E.

The principal executive officers are well known as men of wide and varied experience in the construction and equipment of railways, tramways, generating stations, etc., and the Company will also have the experience of the Foundation Company of New York, the good will of which in Great Britain and the British Dominions other than Canada, it has acquired. This covers a range of constructional work, including industrial plants, power plants, hydro-electric developments, railways, tunnels, bridges, highways, etc. The American company has similar associated companies or branch offices in Canada, Mexico and South America, and in France and Spain, and there will be a close association and continuous exchange of information and experience between the English company and the several other companies, as well as with the American company in New York.

LONDON UNDERGROUND RAILWAYS EXTENSION.

Mr. Young in the House of Commons on Monday stated that the Treasury, on the recommendation of the Trade Facilities Advisory Committee, had agreed to guarantee a loan to be raised by the London Underground Railways Company for the purpose of extending and improving their tube railways. The company estimated that from 15,000 to 20,000 men would be provided with work for a period of from 18 months to two years on the actual construction, and when the work was completed permanent employment would be provided for a considerable number. Full details of the arrangements have not yet been agreed upon, but he thought he would be able to make a complete announcement very shortly.

QUESTIONS IN PARLIAMENT.

EASTER RAILWAY TRAFFIC.—In reply to Mr. Gilbert, Mr. Neal said the was informed that the railway companies intended to run excursions at Easter under conditions and at fares similar to those in operation last year.

BUSINESS NAMES.—Mr. Baldwin said it was not intended to terminate the registration of business names as suggested by the Geddes Committee. The Government proposed to introduce legislation to enable the fees to be increased so that this service might be rendered self-supporting.

MISCELLANEOUS NEWS AND NOTES.

"Keep to the Left" at Bradford.—The Watch Committee have recommended the Town Council to adopt the "Keep-to-the-Left" footpath rule.

The Transport Workers' Federation is endeavouring to extend its scope by the inclusion of railway workers of all grades. A committee has been appointed to revise the constitution of the Federation and it will report at a meeting on March 27.

Falling Cost of Living.—The index figure for March issued by the Ministry of Labour is about 86 per cent. above that of July, 1914. On February 1 the figure was 88 per cent., and on March 1, 1921, 141 per cent. The March figure is lower than that for any date since 1917.

Middlesbrough Tramways Reconstruction.—The Corporation Tramways Committee have decided to proceed with the reconstruction of the Durham Street and Linthorpe Village portions of the track, and to re-equip the cars. The work will be done by departmental labour.

Wigan Tramways Experiment.—Wigan Corporation tramways have agreed to suspend the running of double-deck cars on the Aspull route. They will substitute, experimentally, a service of double-deck cars converted to single-deck, or a service of motor omnibuses or both.

Railway Wages and Conditions.—A meeting of delegates of the National Union of Railwaymen was held on Friday to consider several matters relating to the wages and conditions of work of railway employees. The index figure of the cost of living having fallen, there will shortly be a further reduction of 2s. per week in the wages of railway men.

Leeds Forge Company.—An indication of the extent to which rolling stock manufacturers are being deprived of orders under the present conditions is the passing by the Leeds Forge Company of its dividend, which in the previous year was at the rate of 7½ per cent. The profits for the year ended December 31 last are stated at £67,500 (as against £130,300 in the previous year). Including £30,100 brought in, the available balance was £97,600, and out of this £46,200 was written off to cover the expenses in connection with the recent debenture issue. After payment of the preference dividend, there is a balance of £4,900 to be carried forward.

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Institution of Electrical Engineers.—The summer meeting will be held at Glasgow from May 30 to June 2. An interesting programme has been issued, which includes visits to a number of important works in the vicinity of Glasgow, a reception by the Corporation of Glasgow, and an excursion in the West Highlands.

Cardiff Corporation and the Tramways Company.—Cardiff City Council have given plenary powers to a sub-committee of the Tramways Committee to deal with the proposed purchase of the undertaking of the Cardiff Tramways Company. Councillor Sydney Jenkins (chairman of the Tramways Committee) said it would facilitate matters if this were granted, as there was a tremendous difference between the sum required for the undertaking and the amount the committee were prepared to pay.

"Any Complaints?": A London Innovation.—'Suggestions Posters" have been put up by the London Underground Railways at the Bank and Victoria stations for the inscription of messages by the public. One suggestion which is regarded as useful is to the effect that the booking clerks should be instructed to call out the amount of the fare immediately the ticket is asked for by a passenger. To provide the public with further opportunities for recording their suggestions, the company are extending the scheme to six more stations.

Jarrow Boundary Extension and Tramway Competition.—Jarrow Corporation are promoting an "Extension and Improvement Bill," which will involve an enlargement of the boundaries and of tramway and omnibus powers within and outside the borough. The Court of Referees of the House of Commons have considered applications by Newcastle Corporation and the Gateshead and District Tramways Company for a *locus standi* to oppose the Bill. The Court allowed the Gateshead Company's application, but not that of Newcastle Corporation.

Water Power Developments.—In the House of Commons, Mr. Baldwin on Monday said that the Government did not see their way at present to introduce legislation dealing with the control of water power developments, or for setting up a Water Commission as proposed by the Water Power Resources Committee. The Minister of Health had, however, taken certain administrative measures, and was setting up a Departmental Committee as recommended by the Committee to co-ordinate the work of the several departments responsible for the different water interests.

Reconstruction of Keighley Track.—Keighley Corporation tramways committee have consulted Mr. E. W. Cockerlyne, highways and permanent way engineer of Leeds Corporation, with regard to the condition of their track. In accordance with his report, the committee have recommended the Council to apply to the Ministry of Transport for power to borrow £40,000 for the purpose of reconstructing about two and a half miles of single track. The committee also recommend that as from April 1 the ordinary fare on each stage be increased from 1d. to 1½d., with the exception of children's and workmen's fares.

The Engineering Dispute.—Mr. Chamberlain announced on Thursday that at the desire of the Labour Party there would be a discussion on the engineering dispute in the House of Commons on Monday afternoon. Personally he was sorry the discussion should be asked for, as he was afraid it would be more harmful than helpful, but it would put the House in a false position if he refused to give time for it. Earlier in the day he stated to a deputation, which included Mr. Clynes, that in his view the institution of a court of inquiry would tend rather to prolong and to extend the area of the dispute than to limit either.

The New Waterloo Station.—The King and Queen will visit Waterloo Station on Tuesday afternoon next, when His Majesty will perform the ceremony of opening the new station, which is now practically completed. The London and South-Western Railway Co. have the best equipped terminus in Great Britain. Under one roof there are now 21 platforms. The site covers nearly 24½ acres, or 8½ acres more than the old station, which has been entirely re-built. Of the two main entrances, that nearest York Road forms a memorial to the employees of the company who lost their lives in the war. The original design of the bulk of the station was by the late Mr. J. W. Jacomb Hood when chief engineer to the company, and since his death the work has been under the direction of Mr. A. W. Szlumper, the present engineer-in-chief.

London Passenger Traffic.—Mr. Shortt, in reply to a question in the House of Commons regarding overloading of trains, omnibuses and tramcars in the London area, said that he was informed by the Ministry of Transport that such overcrowding as occurred on trains was during the peak load periods, and arose almost entirely from the physical impossibility of operating more trains over certain congested portions of the lines, and not from lack of rolling stock. The railway companies realised the undesirability of overcrowding, but considerable expenditure was involved in increasing the capacity of the lines by electrification or other means. The question whether the concession in respect of carrying excess passengers in omnibuses and tramway cars should cease or not was now under the consideration of the Commissioner of Police.

Institute of Transport.—The Council of the Institute of Transport announces that it will undertake suitably to celebrate principal events in Transport history and, in this connection, will arrange for celebrations of the centenaries of the opening of the Stockton and Darlington Railway in 1825, and of the Locomotive Trials at Rainhill in 1829, at which latter the famous engine "Rocket" by George Stephenson established the supremacy of steam engines over the then known method of steam transport, namely, stationary steam engines. These celebrations will probably be held in connection with the annual Congresses of the Institute in the years in question, and a centre in the vicinity of Stockton and Darlington and of Rainhill will be selected for the purpose, and appropriate methods devised for adequately celebrating these important events.

Sanction for Doncaster Tramway Improvements.—The Ministry of Transport intend to make an order conferring upon Doncaster Corporation powers to extend and improve the tramway system by the construction of a loop through Trafford Street and Factory Lane, and by alterations in Baxter Gate and St. Sepulchre Gate, in accordance with the scheme outlined in the Corporation's recent application. The scheme will abolish the present Frenchgate terminus for the Brodsworth and Bentley cars.

PERSONAL.

Captain F. H. Masters, O.B.E., has been gazetted major in the Territorial Army Reserve.

Mr. John Craig has been elected President of the National Federation of Iron and Steel Manufacturers for the ensuing year.

Mr. A. H. Martin, who was with the Bristol Tramways and Carriage Company, Ltd., in various capacities for over 16 years, and latterly has been traffic superintendent of the Northern General Transport Co., has been appointed to the position of outside manager for the Crosvile Motor Co., Ltd., Chester. He will take up his duties on April. 1.

Mr. G. H. Hume has been elected alderman of the London County Council. As formerly for several years chairman of the Highways Committee Mr. Hume's services to the London County Council tramways are well known, and his election as alderman is a well-merited recognition of the valuable work which he has done on this and other important committees.

Councillor T. Canby, deputy chairman of the Huddersfield Corporation Tramways Committee, has been appointed chairman of the committee in succession to the late Alderman E. H. Sellers. Councillor Canby became a member of the Tramways Committee in 1911, and in 1915 was appointed deputy chairman. **Councillor T. Woffenden** has been elected deputy chairman.

FINANCIAL.

Metropolitan-Vickers Electrical Co., Ltd.—The directors recommend the payment of a dividend on the ordinary shares of 12½ per cent., less income tax, for the year ended December 31 last.

British Thomson-Houston Co., Ltd.—Allotment letters and scrip certificates in connection with the issue of £1,500,000 7 per cent. debenture stock should be posted at once to Crown House, Aldwych, London, W.C.2, in exchange for definitive certificates.

G. D. Peters & Co., Ltd.—The net profit for 1921 was £5,791, and including the sum of £15,342 brought in, there is a disposable balance of £21,133. A dividend on the ordinary shares at 2½ per cent. per annum is recommended, carrying forward £12,357.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended March 15 amounted to £93,726, a decrease of £7,825 compared with the corresponding period of last year. The route length was 155·91 miles, as compared with 152·26 a year ago. From April 1 (the commencement of the financial year) to March 15 (50 weeks) the total receipts were £4,864,350, an increase of £182,030 on the corresponding period of 1921.

The Brush Electrical Engineering Company's report for the year ended December 31, 1921, shows a substantial improvement in earnings. The gross profit amounted to £232,600, as against £191,100. A dividend on the ordinary shares is recommended at 15 per cent. The depreciation allowance is raised from £13,000 to £15,000, and £73,200, as compared with £43,400, is transferred to the general reserve, bringing the total to £150,000. Subject to taxation, the carry over is £214,074, or £70,800 more than a year ago.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended March 4 give total receipts of £356,706, or £23,975 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £183 2s. 3d. per mile of single track, and last year at the rate of £195 8s. 5d., thus showing a decrease for the week of £12 6s. 2d. per mile open. Owing to a strike of the employees of Newcastle Corporation tramways there were no receipts on that undertaking, the services being entirely suspended.

CONTRACTS.

The Pirelli General Cable Works, Ltd., are supplying 4-core cable to Birkenhead Corporation. The amount of the contract is £1,007 15s.

Warrington Corporation has received the sanction of the Electricity Commissioners to borrow £4,400 for the erection of sub-stations at Stockton Heath and Latchford Without.

Bradford Tramways Committee have accepted the tender of the Kirkstall Forge Co. for the supply of 14 steel axles required for trolley vehicles, at the total price of £1,182 14s.

Newcastle Corporation has been recommended by the Streets Committee to purchase additional motor vehicles for use by the city engineer's department, at an estimated cost of £12,000.

Dunlop Rubber Company.—Sir Arthur Whinney has been appointed to investigate the circumstances which led to the financial position reported at the annual meeting. Any shareholder or other person who has had any transactions or relations with the company material to the inquiry should communicate in writing with Sir Arthur Whinney, 4b, Fredericks Place, Old Jewry, E.C.2.

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Halifax Corporation has been given sanction to borrow £4,200 for laying a double track in Queensbury tramway section.

Wallasey Corporation have accepted the tenders of United Water Softeners, Ltd., for water-treating plant for the electricity department, £1,368; and Metropolitan-Vickers Electrical Company for switchgear, £2,600 10s.

Short Bros. (Rochester and Bedford), Ltd., of 20-30, Charing Cross, London, S.W.1, have secured a further contract from the London General Omnibus Company for 250 of their "S" type omnibus bodies. Deliveries on this contract alone will total 20 complete bodies mounted on chassis per week. The new order will bring the total number of bodies built for the London General Omnibus Company to nearly 600. Messrs. Short Bros. have in hand also other large orders for Railless, Ltd., the East Kent Road Car Co., Salsom Cars, Ltd., etc. All these orders necessitate quick deliveries at competitive prices.

Electrification in Holland.—The Zeeuwsch Vlaamsche Tramweg Company, of Axel, Zeeland, according to the Dutch newspaper *Handelsbelangen* propose laying a tramway, with power station depots, etc., in Zeeland. It is intended to make a start on the work at the end of this year, and the plans will probably be drawn up by W. E. Kramer and H. Polano, engineers, 18a, Noordeinde, The Hague. The same paper reports that the granting of a concession for the electrification and extension of the Gooische Stoomtram may be expected this year. The line from Amsterdam to Hilversum will be the first to be electrified, and a power station and annexe buildings will be constructed in connection with the scheme. The director of the company is F. M. Augustijn, of Watergraafsmeer.

BUSINESS NOTES.

Trackless Cars.—A new company was registered on February 21, with a nominal capital of £10,000. The company adopts an agreement with G. A. Bishop and R. A. Chadwick, and will manufacture and deal with electric trackless and railless cars. The address is Hepworth Chambers, 148, Briggate, Leeds.

A Useful Electrical Handbook.—"The practical electrician's pocket book and diary," a new edition of which has been published by S. Rentell & Co., 36-39, Maiden Lane, W.C.2, is a reliable little guide to all engaged in the electrical industry. It has been thoroughly revised and brought up to date, several chapters have been re-written and new ones added, but by the use of superior thin paper the bulk of the pocket-book is not increased.

Hollings and Guest's horizontal 4-throw chain-driven pump has been selected by the Baroda State Railways for working hydraulic presses in the Baroda workshops. Messrs. Hollings and Guest are also supplying a large hydraulic accumulator to work in conjunction with this plant. They are also supplying a hydraulic briquetting press to the East Indian Railways. We are informed that many other British and foreign railway companies have installed presses of Hollings and Guest's manufacture for various purposes, such as solid tyre fitting, wheel forcing, scrap metal bundling, forging, etc. The manufacturers are producing this class of machinery on a large scale.

Berna Lorries.—La Fabrique d'Automobiles Berna S.A., of Olten, Switzerland, beg to announce that by assignment dated December 31, 1921, they have acquired from British Berna Motor Lorries, Ltd., and from Berna Lorries, Ltd., all rights of manufacture and sale throughout the entire world and that La Fabrique d'Automobiles Berna S.A. are now alone in a position to manufacture, sell and deal in "Berna" products. Spare part stocks have been replenished and almost any order can be executed on receipt. The temporary premises of the London Depot are situated at 25, Short Street, New Cut, S.E.1. The Swiss Company will appoint agencies all over the country and a good business opening is available for firms specialising in commercial vehicles of high-class quality.

METAL PRICES.—Supplied by the British Insulated and Helsby Cables, Ltd.

			Price on March 16.	Price on March 9.
COPPER.	Best Selected	per ton	£64	£65 10s.
	Electro Wirebars ..	per ton	£68 15s.	£67 15s.
	H.C. Wire, basis ..	per lb.	10½d.	10½d.
	Sheet	per lb.	9¾d.	9¾d.
PHOSPHOR BRONZE WIRE (Telephone)		per lb.	1s. 2½d.	1s. 2½d.
BRASS 60/40	Rod, basis	per lb.	7½d.	7½d.
	Sheet "	per lb.	9¾d.	9¾d.
	Wire "	per lb.	10½d.	10½d.
PIG IRON.	Cleveland Warrants ..	per ton	£4 15s.	£4 15s.
	Galvanised Steel Wire, 8 S.W.G.	per ton	£19	£19
LEAD PIG.	English	per ton	£22 15s.	£22 5s.
	Foreign or Colonial ..	per ton	£21 12s. 6d.	£20 15s.
TIN.	Ingot	per ton	£143 17s. 6d.	£143
	Wire, basis	per lb.	2s.	2s.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

WEEKLY TRAFFIC RETURNS.

COMMON FUND COMPANIES.	Week ending March 11, 1922 ..	£218,814
Metropolitan District Rly. Co. ..	Corresponding week last year ..	225,485
London Electric Rly. Co.	Decrease	6,671
City & South London Rly. Co. ..		
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	2,098,538
London General Omnibus Co., Ltd.	Corresponding period last year ..	2,275,246
	Decrease	176,708
LONDON & SUBURBAN TRACTION GROUP	Week ending March 11, 1922 ..	£48,900
Metropolitan Elec. Tramways, Ltd.	Corresponding week last year ..	50,292
London United Tramways, Ltd.	Decrease	1,392
South Met. Elec. Tr. & Ltg. Co., Ltd.		
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	455,843
Gearless Motor Omnibus Co., Ltd.	Corresponding period last year ..	493,911
	Decrease	38,068

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE Wks.	1921-22.	+ or —
Aberdeen Corporation	Mar. 8	3,289	3,294	+ 5	40½	142,897	— 12,290
" Motor Buses	" 8	52	128	+ 76	40½	9,442	+ 8,191
Ayr Corporation ..	" 11	548	485	— 62	43	30,403	— 2,258
Barrow Corporation ..	" 11	879	598	— 281	49	40,151	— 4,094
Belfast City	" 10	12,006	11,745	— 261	49	612,966	+ 51,266
Birkenhead Corporation	" 12	2,590	2,550	— 40	48½	128,370	— 13,211
" Motor Buses	" 12	300	543	+ 153	48½	32,453	+ 12,201
Birmingham Corporat'n	" 4	31,657	28,883	— 2,774	48	1,404,089	— 126,171
" Motor Buses	" 4	2,284	1,931	— 353	48	94,398	— 2,574
Blackburn Corporation	" 1	2,409	2,158	— 251	48½	114,664	— 10,837
Bradford Corporation..	" 4	13,926	13,948	+ 22	48	658,575	+ 10,034
Burnley Corporation ..	" 11	3,531	3,178	— 353	..	..	..
Burton-on-Trent Corp.	" 12	611	585	— 26	49	30,570	+ 366
Bury Corporation ..	" 12	2,527	2,465	— 62	49½	119,365	— 5,587
Chatham & District ..	" 2	1,581	1,544	— 37	9	12,607	— 1,553
Chesterfield Corporat'n.	" 6	642	579	— 63	49	28,596	— 808
" Motor Buses	" 6	868	728	— 140	49	36,950	— 2,830
Derby Corporation ..	" 11	2,220	2,098	— 122	49	105,435	— 7,666
Dundee City ..	" 8	3,004	2,926	— 78	42½	135,090	+ 4,871
East Ham Corporation	" 11	2,139	2,191	+ 52	49½	104,348	+ 2,277
Edinburgh Corp. Trys.	" 4	..	11,696	..	42	528,046	+ 4,074
" Motor Buses	" 4	..	3,319	..	42	148,795	..
Glasgow Corporation ..	" 11	46,399	44,281	— 2,118	40½	1,830,473	— 260
Glossop (U.E. Sup. Co.)	" 11	218	233	+ 15	10	2,297	— 28
Halifax Corporation ..	" 7	4 134	3,891	— 243	47½	208,101	— 622
" Motor Buses	" 7	111	64	— 47	47½	3,730	— 1,728
" Railless Cars	" 7	..	49	..	33	1,735	..
Huddersfield Corporatn.	" 11	5,307	4,833	— 474	50	258,409	+ 7,641
Ilford U.D. Council ..	" 11	1,389	1,470	+ 81	49	73,752	+ 9,995
Ipswich Corporation ...	" 11	824	747	— 77	49	41,905	— 5,201
Isle of Thanet ..	" 8	545	529	— 16	22	13,745	+ 1,080
Kilmarnock Corporat'n	" 11	353	321	— 32	42½	15,292	— 567
Leicester Corporation..	" 11	6,331	7,146	+ 815	10	71,374	+ 6,681
Liverpool Corporation	" 11	29,506	28,962	— 544	10	286,345	+ 10,700
London County Ccl. ..	" 15	101,551	93,726	— 7,825	50	4,864,350	+ 182,030
Maidstone Corporation	" 9	412	397	— 15	48	22,895	— 587
Manchester Corp. ..	" 11	37,884	37,232	— 652	49	1,895,369	+ 181,127
Newcastle-on-T. Corp.	" 4	11,306	Strike	— 11,306	48	526,492	— 6,867
Nottingham Corp.	" 9	7,348	7,663	+ 315	49	337,569	— 40,528
Oldham Corporation ...	" 12	4,592	4,689	+ 97	51	238,802	+ 2,667
Preston Corporation ...	" 8	1,865	1,832	— 33	48½	92,807	+ 3,192
" Motor Buses	" 8	..	135	..	6½	856	..
Reading Corporation ...	" 9	1,512	1,529	+ 17	49	77,163	— 3,733
" Motor Buses	" 9	246	317	+ 71	49	16,493	+ 3,567
Rotherham Corporation	" 13	2,675	2,209	— 466	49	110,779	— 20,449
Salford Corporation ..	" 12	10,645	10,378	— 267	48½	525,054	+ 20,643
Sheffield Corporation..	" 12	20,062	18,568	— 1,494	49½	954,405	— 73,236
Southampton Corp. ..	" 8	2,934	2,883	— 51	49	144,598	— 9,152
" Motor Buses	" 8	176	101	— 75	49	7,291	— 4,496
Southend-on-Sea Corp.	" 8	1,646	1,941	+ 295	49	119,616	+ 8,016
South Shields Corp. ..	Feb. 25	1,862	1,672	— 190	48	80,240	— 11,122
St. Helens Corporation	Mar. 7	2,078	1,627	— 451	49	86,697	— 15,445
Sunderland Corp. ..	" 13	2,730	2,497	— 233	49	127,952	— 21,623
Swindon Corporation..	" 15	368	325	— 43	49½	19,308	+ 65
Tyneside Trys., Trds...	" 8	1,096	697	— 399	10	7,706	— 3,335
Wallasey Corp. ..	" 11	2,588	2,527	— 61	49½	136,153	+ 6,976
" Motor Buses	" 11	141	211	+ 70	49½	11,564	+ 3,209
Walsall Corporation ..	" 11	1,825	1,654	— 171	49	80,661	— 8,977
" Motor Buses	" 11	1,231	954	— 277	49	46,018	— 12,415
Walthamstow U.D.C....	" 11	1,889	1,789	— 100	49	98,838	— 978
Warrington Corp. ..	" 9	1,060	1,038	— 22	49	48,971	— 517
West Ham Corp. ..	" 9	6,081	5,621	— 460	49	288,196	+ 1,761
Wolverhampton Corp.	" 15	2,218	2,318	+ 100	50	116,285	— 4,161
" Motor Buses	" 15	630	649	+ 19	50	32,674	+ 8,962

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1920-21.	1921-22.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..	Mar. 11	£82,703	88,613	10	£827,026	+ 27,853
Ballarat & Ben. (4 wks.)	Jan. 1	5,342	5,565	40	45,852	+ 2,909
Brazilian Traction (Mlrs)	Jan.	12,875,000	15,032,000	4	15,032,000	+ 2,157,000
Brisbane	Jan.	46,280	48,790	4	48,790	+ 2,510
British Columbia $	Jan.	908,385	907,242	30	6,100,157	+ 174,401
Buenos Aires Lacroze ..	Feb.	53,952	55,227	34	460,044	+ 8,695
Burmah Tr. & Lght. Rs.	Feb.	48,405	52,380	9	403,127	+ 45,959
Calcutta .. Rs.	Mar. 11	81,297	111,612	10	1,054,253	+ 488,106
Cape Town	Jan.	..	30,289	..	..	..
Carthagena & Herrerias	Feb.	2,839	2,773	8	5,848	— 868
Cordoba	Jan.	18,696	22,152	43	230,068	+ 32,934
East India	Feb.	3,819	3,737	30	28,571	— 688
Kalgoorlie	Nov.	2,969	2,419	48	24,944	— 8,728
La Plata	Feb.	* 728	6,318	52	13,041	+ 5,806
Madras (2 weeks) Rs.	Feb. 28	* 9,511	39,503	8	193,602	+ 145,893
Manila .. .. $	Jan.	321,449	309,252	4	309,252	— 12,197
Montevideo	Feb.	48,119	48,111	17	180,301	— 11,462
Para	Feb.	20,545	21,582	13	67,208	— 1,821
Pernambuco	Mar. 12	4,757	3,746	10½	38,283	— 11,031
Port Elizabeth	Jan.	..	8,120	..	..	..
Rangoon .. Rs.	Jan.	122,558	137,850	4	137,850	+ 15,292
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Feb. 11	11,334	16,676	6	93,613	+ 31,671
Winnipeg .. $	Jan.	506,229	507,047	4	507,047	+ 818

* Strike of employees.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

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THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

LONDON, MARCH 25, 1922.

A LESSON FROM NEWCASTLE.

The settlement of the Newcastle tramway strike serves to emphasise once more a fallacy that is all too prevalent in certain sections of the trade union movement. Who was primarily responsible for the three weeks cessation of work in this instance—the men themselves or their leaders—it is hard to say, but that they were misguided is beyond doubt. Their action alienated the sympathy of the people of Newcastle from the first, and the men might have known at once that in the absence of such sympathy their cause was lost. How could it have been otherwise? Consideration would have shown the employees from the first the justice of the conclusion reached by the Tramways Committee that the 44-hour week with which they had been especially favoured for several years must now be reviewed if the undertaking was to carry on successfully and meet the requirements of the public. Unheeding, they persisted in their unreasonable demand for conditions not met with on any other tramway system in the country. It was inevitable that they would ultimately have to agree to the requirements of the management, but at what a cost they chose to do so! Something like £30,000 must have been lost to the Corporation in receipts, the men themselves sacrificed three weeks' pay, and the public were subjected to extreme inconvenience and serious loss. For all this trouble the men have got exactly what they could have had on the day they abandoned the cars—in fact, they declined a slightly better offer in order to "down tools." This is but another regrettable instance of the many precipitate attempts to fly in the face of existing economic conditions which have been so discouragingly frequent within the last year or two. Those responsible for such policy might with profit take to heart the words uttered only this week by one of the greatest of their leaders who has himself worked in the shops of Tyneside. Mr. George N. Barnes, who said his sympathies always had been, and always would be, with Labour, declared that in their own interest men must not regard themselves merely as wage-earners, but as servants of the community. "If they don't get that into their heads the community will sometime put it there; for after all the community is the greatest sufferer in all the disputes that may come about." Organised as Labour was, he said, it had to a large extent in recent years misused its powers, and the community, Labour itself included, was now suffering the consequences. It will ever be as disastrous for employees to disregard this advice as it would be for employers selfishly to disregard just claims of their men. A fair solution will nearly always be peaceably reached if both parties give due consideration to the interests of the public, the patrons alike of managements and men.

EDINBURGH TRAMWAYS INQUIRY.

CORPORATION AND TRANSPORT MINISTRY'S POWERS.

At a special meeting of Edinburgh Town Council on Monday, it was decided, by 48 votes to 17, to proceed with the application to the Ministry of Transport for permission to erect centre poles in Princes Street, and to state their case at the inquiry which the Ministry will hold. On the previous Friday, at a meeting of the Tramways Committee, Judge Robertson moved that the Committee should remit the whole question of proceeding with the inquiry to the Town Council on the ground that since the inquiry was first mooted its scope had been widened beyond what was originally contemplated. As this would mean an additional burden on the ratepayers, the whole Council should decide whether the Corporation should proceed with the inquiry unless a definite assurance was obtained from the Ministry as to the exact limits of the inquiry. This course the Committee adopted. The general manager (Mr. R. S. Pilcher) has issued the following statement of the respective costs of the various forms of equipment that might be used:

Cost of constructing tramway on the south side of Princes Street with overhead equipment (including new permanent way)	£30,527
Span wire construction (no alteration to position of permanent way)	3,175
Centre pole construction (including reconstruction of north side rails) ...	16,851
Conduit system (new conduit)	59,760

At the meeting of the Council, a letter was read from the Automobile Association and Motor Union protesting against the erection of centre poles, as being dangerous to traffic. The Lord Provost, who presided, said that Mr. Neal (Parliamentary Secretary to the Transport Ministry) had informed them that the question of expense largely rested on the parties themselves, and that the public cost should be curtailed. In his lordship's view the question of expense was not one they could put forward for avoiding an inquiry. Regarding the scope of the inquiry, the Lord Provost said he would be most zealous in combating an attempt by any outside body to infringe upon the powers of the Corporation in its administrative duties within the limit of its statutory powers. In conclusion, he said they should go forward with the inquiry.

Judge Robertson moved that in view of all the circumstances they withdraw the application to erect centre poles. He contended that the inquiry would deal with matters which did not come within the jurisdiction of the Transport Ministry, but were the concern of the Town Council. Judge Goalen seconded. Mr. Mancor (convenor of the Tramways Committee) proposed that the Corporation proceed with the inquiry, and said they must submit to a constituted authority. Personally, he was so convinced of the soundness of the policy of centre poles that he thought a public inquiry under the jurisdiction of experts would only bring out its merits. Bailie Sleigh seconded.

The Town Clerk said if they took the assurance they had from the Ministry of Transport, that the inquiry was to be confined to close lines, he did not see that it should extend beyond two or three days, and the expense would be £500. In view, however, of the preparations he thought necessary, the cost of the inquiry might be anything between £500 and £1,500.

STATEMENT IN THE HOUSE OF COMMONS.

Lieut.-Col. A. Murray on the same day (March 20) asked the Parliamentary Secretary to the Ministry of Transport the nature of the statutory sanction under which the Edinburgh tramway inquiry was to be held, and whether, having regard to such sanction, the question of amenity could or could not be included within the scope of the inquiry.

Mr. Neal.—Under the terms of the Edinburgh Corporation Acts and Orders, mechanical power can only be used on the tramways with the consent and according to a system approved by the Minister of Transport, whose consent is also necessary to any alteration of the position of the tram lines in the roadway. The purpose of the inquiry is to elicit such information as may be necessary to enable a correct decision to be arrived at. The safety of the public is, of course, the primary object, but the Minister does not appear to be precluded from taking other matters into consideration. Mr. Neal added that the Edinburgh City Council were now in full harmony with the inquiry, and he did not propose to limit the discretion of the people holding the inquiry.

Lt. Col. Sir J. Hope asked the Parliamentary Secretary to the Ministry of Transport on Wednesday whether in the event of the Edinburgh Town Council deciding to erect span wires in Princes Street he would consider the proposed inquiry unnecessary. Mr. Neal replied that having regard to the acute local differences of opinion he thought the inquiry should proceed in any event. He repeated what he had said on Monday, that the consent and approval of the Ministry of Transport to the use of any system of mechanical power was a statutory requirement.

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SETTLEMENT OF NEWCASTLE STRIKE.

TRAMWAY EMPLOYEES ACCEPT NATIONAL AGREEMENT.

The strike of the employees of Newcastle-upon-Tyne Corporation tramways ended on Sunday last, after having lasted three weeks, and the car service was resumed on Monday. On the previous Saturday the men held a ballot to decide whether to hold out for the 44-hour week or to accept the latest offer of the Tramways Committee. This was that the working week should be of 48 hours and that the full terms of the National Agreement should be observed. The result of the ballot was as follows: For acceptance, 887; against, 185; majority for acceptance, 702. Although this decision indicated a strong desire to resume work, the men were in doubt as to how their action would affect the members of other unions who were also on strike. The difficulty in respect of them was referred to a meeting of their representatives and the Transport and Electricity Sub-Committee, at the conclusion of which the following statement was issued by the Committee:

"The Transport and Electricity Sub-Committee on Sunday morning met representatives of the National Amalgamated Union of Labour, the Electrical Trades Union, the National Association of Vehicle Builders, the Amalgamated Engineers' Union, and the National Union of General Workers, representing in all about 240 men employed in the tramways power station and car works, who, in common with the motormen and conductors, have been asked to work the hours recognised by their respective unions instead of the 44-hour week formerly fixed by the City Council. Mr. T. Bowmaker, of the Amalgamated Union of Engineers, stated that notwithstanding the result of the ballot of the vehicle workers, the other unions stood out for a 44-hour week, and were not prepared to accept the result of the ballot.

"The Committee informed the deputation that they required the whole of their employees to work the hours recognised by their unions in the same way as has been agreed by the vehicle workers, who by a majority of 887 against 185 have accepted these terms. The depots, car works, and power station will be open for all men to begin work on Monday morning."

At a meeting of the tramway employees on Sunday night, the position arising out of the conference referred to above was considered and the following resolution was ultimately adopted by a fairly large majority of the vehicle workers:

"That we accept the ballot vote as taken on Saturday, and return to work to-morrow. In the event of any of our members being instructed to do the work of the men on strike, they shall be instructed to refuse to blackleg."

MR. BARNES' PLEA FOR MORE PRODUCTION.

An able and frankly critical address on "Some Common Fallacies in Trade and Industry" was delivered by Mr. G. N. Barnes, C.H., M.P., at a conference of the Industrial League and Council held in the Caxton Hall, S.W., on Wednesday. Mr. H. E. Blain, C.B.E. (assistant managing director of the London Underground Railways and Vice-President of the League), occupied the chair, and paid a warm tribute to Mr. Barnes, who was, he said, universally recognised as possessing honesty of purpose and integrity of aim.

Mr. Barnes declared that the improvement of the conditions under which we live would come with the inauguration of a better social sense, of a better feeling between men and women of all classes; it would never come through malice or class conflict. Some of their friends told them that if higher wages were paid, workmen would be able to buy and everybody would be employed. But the problem was not so easy as that. The critics of the present system forgot that the British workman did not consume the products he turned out, except a very small proportion of them. Our troubles arose, therefore, from the fact that we had to produce for people overseas —at a price—or if we could not, then other countries would cut us out. A larger unit of production per head on the part of British workmen and a greater effort to attract the foreign buyer would do more to lessen unemployment than anything else he knew. It was not so much wages that were at the bottom of industrial disputes; in the era through which we were passing, when machinery played an increasingly important part, the paramount necessity was to get the greatest output from that machinery. One of the main things we must do was to get this into the heads of the workman, and he would soon find that a few shillings per week on his wages would be regarded by his employer as comparatively unimportant. Employers and workmen must resolve to get the best out of the present industrial system by friendly contact in a spirit of co-operation and good-will, though the Government might help by reducing taxation to the lowest possible limit.

QUESTIONS IN PARLIAMENT.

SPEED LIMIT OF MOTOR VEHICLES.—Mr. Neal in the House of Commons on Monday, said that with regard to the abolition of the speed limit of motor vehicles legislation would be necessary to carry into effect the proposals recently made with regard to the abolition of the speed limits, and that such proposed legislation was under consideration. He could not say whether it would be possible to introduce a Bill during the present session, and he did not think it desirable to make any forecast as to its provision.

OVERCROWDING ON CITY RAILWAYS.—Mr. H. Brittain asked the Parliamentary Secretary of the Ministry of Transport whether on the underground railway systems of either Paris, Berlin or New York it had been at any time possible during the rush hours in the morning and evening to limit the number of passengers to the seating accommodation. Mr. Neal replied that he did not think any such arrangement had been found possible, and such information that he possessed showed that complaints due to overcrowding are common in the cities mentioned.

LONDON UNDERGROUND EXTENSIONS.—On Wednesday Mr. Hilton Young said the agreement between the Treasury and the Underground Electric Railways Company of London for the extension and improvement of the tube railways was not yet finally completed. In substance, and subject to various conditions, the Treasury guaranteed the principal and interest on debentures to be made to the company and the City and South London Railway Company up to a total amount of £5,000,000.

STANDING PASSENGERS.—On Tuesday Mr. Shortt, in reply to Viscount Curzon, said no decision had been reached in regard to the proposal to enforce regulations preventing the standing of passengers in omnibuses and tramcars. Under present arrangements the regulations will come into force on April 1.

TORRINGTON-HALWILL LIGHT RAILWAY.—On Wednesday Mr. Neal said the North Devon and Cornwall Junction Light Railway Company had been informed that the Government were prepared, subject to the fulfilment of certain conditions, to contribute a sum not exceeding £125,000 toward the cost of the construction of the Torrington-Halwill Light Railway. The company hope to execute the contract for the work in the course of the present month, and the contractors would be able to start work immediately afterwards if the conditions above mentioned had been complied with in the meantime.

L.C.C. TRAMWAY MATTERS.

NEW COMMITTEES APPOINTED.

At the meeting of the London County Council on Tuesday, the following were appointed members of the Highways Committee:—

D. Davies	Lt.-Col. A. C. H. Kennard	Capt. G. E. Pierrepont
F. Bertram Galer	Samuel March	F. W. Raffety
T. C. E. Goff	Charles W. Matthews	Angus N. Scott
The Earl of Haddo	(Chairman)	W. J. Webb
G. H. Hume	W. J. Morton	Capt. O. Wakeman
E. H. Kemp	John Osborn	Henry Ward
	Miss Rachel M. Parsons	

The Stores and Contracts Committee will consist of the following 13 members:—

Lt.-Col. Eric Ball	Edward Cruse	W. C. Johnson
Sir John Benn, Bart.	D. Davies	W. J. Pincombe
J. G. Butler	Frank Holmes	Sir Lulham Pound, Bart.
David Cawdron	William Hunt	Percival H. Reed
		Major Isidore Salmon

The London Electricity Supply Committee will consist of the following 14 members:—

Ernest M. Dence	The Lord Monk-Bretton	Major Isidore Salmon
Percy A. Harris	Herbert Morrison	Ernest Sanger
G. H. Hume	O. W. Nicholson	Henry Ward
Sir Cyril Jackson	R. C. Norman	W. J. Webb
Henry Mills	Miss Rachel M. Parsons	

The Committee of Selection reported that they did not propose that the Special Committee of Inquiry on Tramways should be re-appointed.

MISCELLANEOUS NEWS AND NOTES.

Tramway Workers' Conference.—Mr. J. H. Thomas and Mr. Robert Williams are two of the delegates to the International Transport Workers' Conference which is to take place at Stockholm from April 3 to April 5.

Cardiff Motor Omnibuses.—Cardiff Corporation has authorised a sub-committee of the Tramways Committee to deal with the purchase of the Cardiff Tramway Company's undertaking, which owns the Whitchurch omnibuses.

Brighton Trolley Omnibuses.—The Ministry of Transport has, it is reported, extended the time to August, 1923, for the installation of trolley omnibus equipment under the Brighton Corporation Act, 1921, and the Order, 1917.

Increased Fares at Keighley.—The minimum fare on Keighley Corporation tramways will be increased from 1d. to 1½d. on April 1. The Town Council have declined to sanction a proposal to borrow £40,000 for track reconstruction.

Railway Electrification in the United States.—The Illinois Central Railroad Company are about to issue 50,000,000 dollars of 7 per cent. preferred stock for the purpose of electrifying their lines and reconstructing their terminals in Chicago.

Preston Motor Omnibuses.—Preston Corporation has received the sanction of the Ministry of Transport for a loan of £4,765 for the purchase of motor omnibuses. The loan is to be repaid in a period not exceeding six years.

London Government.—The Royal Commission on London Government will meet at the Middlesex Guildhall on Tuesday at 11 o'clock and on Wednesday at 10 o'clock. On Tuesday the Commission will resume the hearing of evidence on behalf of the County Borough of Croydon.

Derwent Valley Railway and Locomotive Power.—At the annual meeting of the Derwent Valley Light Railway Co. at York, on March 16, it was stated that the company's working agreement with the North-Eastern Railway terminated this year, and it would be necessary to enter into a renewal or alternatively to provide their own locomotive power. This question was being closely investigated by the directors. The Derwent Valley Railway is one of the few subsidiary lines exempted from the operation of the Railways Act, 1921.

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No Season Tickets at Oldham.—The Corporation Tramways Committee, after having considered a report by the general manager and engineer (Mr. W. Chamberlain), decided against a member's proposal to introduce season tickets. Mr. Chamberlain said he was sure they would lose revenue by such a system.

Summer Time.—By an order made in Council, it is provided that Summer Time shall come into effect at 2 a.m. to-morrow (Sunday), March 26, and shall continue until 2 a.m. (Sunday), October 8. The period fixed is in accordance with the agreement recently made with France and Belgium to secure uniformity of summer time.

Omnibus Employees' Wage Reduction.—From April 4 the wages of the employees of the London General Omnibus Company will be reduced in accordance with the agreement made in November last. The reduction of about 5s. per week is based on the index figure of the cost of living on March 1 and will become effective as from the week ended April 11.

Belfast Track Reconstruction.—At a meeting of Belfast City Tramways Committee the general manager (Mr. J. S. D. Moffet) submitted a report on two alternative proposals for permanent way reconstruction in 1922. These were: (1) for proceeding with the second instalment as outlined in the principal report of last year, and (2) for a modified instalment dealing with the sections most in need of repair. It was decided to advertise for alternative tenders.

International Railway Congress.—The International Railway Congress will be held at Rome from April 18 to 28 in the Palais de l'Exposition Nationale. M. Tondolier, of the Belgian State Railways, will preside. The Ministry of Transport will be represented by Col. J. W. Pringle, chief inspector of railways, and Sir W. M. Acworth. There will be an official reception at the capital, and the delegates will on Wednesday, April 19, be the guests of the Italian Government at dinner. Among the subjects to be discussed is that of railway electrification.

Through Service: London to Hampton Court.—With the completion of the work of lowering the roadway under the railway bridges at Clapham and Balham stations, the London County Council tramway authorities on Friday commenced running the new class E/1 cars on the Clapham, Balham, and Tooting route. These cars have the overhead trolley arm as well as the underground connection, and when the work of joining up the track at Merton with the London United Tramways is completed, it is proposed to run a through service from Victoria Embankment to Wimbledon station.

Visit to Leyland Motor Works.—Representatives of the North-Western division of the Institute of Transport visited the works of Leyland Motors, Ltd., on March 16. The party numbered 50, and were conveyed from works to works and subsequently to Preston in Leyland saloon omnibuses. Among those present were representatives of the Lancashire and Yorkshire (L. and N.W.), the Midland and the Great Central Railway Companies. The party were specially interested in the Leyland company's coach works, where large numbers of motor omnibuses are under construction. The railway members of the Institute took particular notice of this branch of the company's works.

Railways and Road Transport.—The Federation of British Industries has issued a memorandum in reply to the L. & N.W. Railway Group's statement in support of its claim for powers to provide transport by road. Traders appear to be apprehensive that if the railway companies are granted these powers they will be driven by circumstances to attempt the effective control of the road transport system in the country. Traders also feel that the whole question is one of such magnitude and importance to the community at large that to attempt to deal with it piecemeal by private Bill is not in the public interest, and if powers are to be given they should be all on the same basis.

Vehicle Builders' Strike Settled.—A settlement has been effected of the strike, which had lasted several weeks, of members of the Amalgamated Society of Railway Vehicle Builders, Wheelwrights, Carpenters, and Mechanics, numbering over 10,000. The employers agreed to withdraw the demand for a 5 per cent. reduction in time work pay, the men accepting a reduction of 15 per cent. on piecework rates. The settlement will result in an average reduction of about 12s. per week per man on piecework. The Lancashire employers refused to withdraw the demand for a reduction of 6s. 3d. per week in time workers' wages, and the strike has consequently been prolonged in that area.

Electrification of the Southern Railways.—It is reported that Mr. Arthur Neal, Parliamentary Secretary to the Ministry of Transport, on March 16 had an interview with the chairmen and managers of the Southern Railway Group, and that an arrangement was reached which will, it is expected, result in the electrification schemes of the Brighton Railway and the South-Eastern and Chatham Railway being undertaken at once. The South-Eastern Railway's estimated expenditure on electric traction is £5,800,000. The first stage will cover 210 track miles and extend to Orpington, Hayes and Addiscombe Road, Croydon, The second stage will extend to Gillingham, Tonbridge and Dorking, and the third will be mainly sidings in the same area. The full cost of converting the main suburban lines of the London, Brighton and South Coast Railway is estimated at £10,000,000. The immediate project is the electrification of the lines near Coulsdon and Cheam, thus adding 300 track miles to the 111 miles already electrified. The L. & S.W. Co. have withdrawn their objection to the electrification scheme of the South-Eastern Company, and the Ministry of Transport have forwarded the electrical proposals to the Trade Advisory Committee, whose consent is practically assured.

Railway Advertising Enterprise.—The Great Western Railway Company are advertising the offer of three prizes (100 guineas, 75 guineas, and 50 guineas) for original designs for posters to advertise three health and holiday districts served by their system—the Cornish Riviera, Devon, and the Cambrian Coast.

Railway Wage Reduction.—A reduction of 4s. a week in many grades of railway men will come into force on April 1. The Central Wages Board has agreed that there shall be a general reduction of 2s. a week following on the fall in the cost of living from the index figure of 99 in December to 86 points at the present time (over the 1914 level). In the Ministry of Labour's scale a fall or rise of five points involves a variation of wages of 1s. a week. Acceptance by the unions of an extension to the English railways of the decision of the National Wages Board to the Scottish Companies involves the doubling of the 2s. reduction in the case of many grades. The actual reduction of the existing wages rates will therefore be 4s.

British Tramways in Montevideo.—Despite formal protest by the British Foreign Office, the municipality of Monte Video continues forcibly to control the funds of the British tramway company in that city. The municipality has extracted a further sum from the company's coffers to pay the increase in wages in respect of the first fortnight in March. The extraordinary situation disclosed originated in the refusal of the Uruguay Government, at the instance of the Socialist group in the Chambers, to grant permission to the tramway company to raise its tariff. The company being therefore unable to grant the men increased wages, a strike ensued, whereupon the municipality ordered the men back to work and itself seized control of the company's property and paid the increase out of the company's funds. The company is taking legal action against the municipality.

Opening of the New Waterloo Station.—In the absence of His Majesty the King, through a slight indisposition, Queen Mary performed the opening ceremony of the new Waterloo Station on Tuesday last. There were present a large body of officials and representatives of the London and South-Western Company's staff, the heads of other railway companies and several thousands of the general public. The Queen was received at the York Road entrance by the Chairman of the Company (Brigadier-General H. W. Drummond) and the deputy-chairman (Sir William Portal). A guard of honour was formed of nearly 100 of the company's servants who distinguished themselves in the war. Having inspected these, the Queen broke the silken cord which had hitherto been stretched across the entrance to the Victory Arch, the imposing architecture of which she was able to admire. Beneath the archway her Majesty saw the fine bronze mural tablets bearing the names of 585 of the Company's employees who gave their lives in the war. She then passed down the spacious "concourse" which affords access to the 21 platforms.

Football Traffic at Nottingham.—To cope with the additional traffic anticipated on the occasion of the Cup Tie on March 4, the Corporation Tramways ran a number of extra cars between the football ground and both the City Market Place and Bath Street Junction (Sneinton), a distance of 1.12 miles. A special fare of 2d. was charged on these 27 cars, and a further six extra cars were run between the Market Place and the terminus at Trent Bridge (which is within a few hundred yards of the ground) at the ordinary fare of 1½d. After the match a few of the extras were run from the Market Place to some of the outlying termini at ordinary fares. A few figures as to receipts and running costs may tend to dispel (writes a correspondent) the idea some of the public have that the department reaped a rich harvest from the special fares. Most of the men operating these cars were called upon to work on their "rest" day, and under a local arrangement the rates of pay for the time actually worked on such duties (with a minimum of four hours) are 50 per cent. above the ordinary rates. Further, some of the cars were of the bogie type, which necessitated the use of two conductors, one in charge of each deck. The special cars ran 686 miles, and carried 12,400 passengers, of which 6,000 paid a 2d. fare. The total receipts amounted to £92, or 32.2d. per car-mile. The wages of motormen, conductors, and extra regulators, etc., required, together with the cost of power, amounted to £57 9s., or 20.1d. per mile. This leaves a balance of 12.1d. per mile, representing excess of receipts over cost of wages and power alone. When this figure is compared with that of 10.9d. per mile, which represents the balance betwen similar items of income and expenditure for all the services during the year ended March 31, 1921 (when a surplus of only £655 or .04d. per mile, was available for the Reserve Fund) it is readily seen that very little profit is obtained from these extra services in spite of the increased fare charged.

CONTRACTS.

Babcock & Wilcox, Ltd., have a contract for boilers to be supplied to Burton-on-Trent Corporation at £40,180.

Burton-on-Trent Corporation have accepted tenders for electricity works extension amounting in the aggregate to £78,726.

J. W. Courtenay, Ltd., of Amberley House, Norfolk Street, London, W.C.2., have been appointed sole advertising contractors for Ipswich Corporation tramways.

The French Thomson-Houston Co. have, it is reported, obtained an order for 1,000 dynamos for the French State Railways, which are required for the lighting arrangements of local trains.

The Woods Gilbert Rail Remodelling Co., of 170, Strand, London, W.C., are now carrying out the repair of Exeter Corporation tramway track by means of electric arc welding and rail grinding.

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The British Thomson-Houston Co.'s tender for main E.H.T. switchboard extension has been accepted by Warrington Corporation.

Clough, Smith & Co., Ltd., of 36, Victoria Street, London, S.W.1, have arranged a contract with the Eston Urban District Council for the supply and erection of the overhead equipment, comprising 700 poles, etc., and the supply and laying of about 4½ miles of underground mains in connection with the town lighting of South Bank, Grangetown, Normanby and Teesville.

PERSONAL.

Mr. Charles W. Matthews has been appointed chairman of the Highways Committee of the London County Council.

Birmingham Corporation Tramway Officials.—The principal officials of the Birmingham Corporation tramways, in addition to Mr. A. Baker, the general manager, are now as follows :—assistant general manager, Mr. J. McDonnell ; chief engineer, Mr. A. C. Baker ; electrical engineer, Mr. T. Rowland ; permanent way engineer, Mr. G. Warner ; traffic superintendent, Mr. L. Johnson. Councillor Frederick Smith is chairman of the Tramways Committee.

The Late Alderman E. H. Sellers.—At the monthly meeting of Huddersfield Town Council, the Mayor moved a resolution expressing the sincere regret of the Council at the death of Alderman Sellers, and placing on record their high appreciation of his services to the Council, particularly as chairman of the Tramways Committee and Technical College Governors.

We regret to record the death of **Dr. J. T. Merz,** which occurred at his residence, The Quarries, Newcastle-on-Tyne, on March 21. Dr. Merz was educated in Manchester, and after spending some years at German universities, he was sent to the works of the Tharsis Copper Company, at Hebburn, afterwards becoming manager of the works there and at Birmingham, Glasgow and South Wales. He was a pioneer in the introduction of electric supply, and in 1881 became a director of the Swan Electric Light Company, the first electric lamp manufacturing company in England. His wife and two sons, Mr. C. H. Merz and Mr. Norbert Merz, and one daughter survive him.

FINANCIAL.

Leeds Tramway Estimates.—No profit is expected on Leeds Corporation tramways, as any surplus will be absorbed in clearing off the current year's deficit.

Hadfield's, Ltd.—A final dividend of 6d. per share has been declared, making with the interim dividend 5 per cent., free of tax, for the year. The dividend for the previous year was 5 per cent., and in the preceding year it was 10 per cent.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended March 22 amounted to £90,820, a decrease of £11,494 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year) to March 22 (51 weeks) the total receipts were £4,955,024, an increase of £170,390 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended March 11 give total receipts of £350,233, or £27,792 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £179 15s. 9d. per mile of single track, and last year at the rate of £194 1s. 1d., thus showing a decrease for the week of £14 5s. 4d. per mile open. Owing to a strike of the employees of Newcastle Corporation tramways there were no receipts on that undertaking, the services being entirely suspended. Of 51 undertakings, 42 show a decrease in earnings as compared with the same week last year.

BUSINESS NOTES.

The British Thomson-Houston Co., Ltd., have removed their London offices from 83, Cannon Street, to Crown House, Aldwych, W.C.2. Telephone : Regent 8040.

The Daimler Co., Ltd., have notified the members of the Motor Trade Association that they have altered the price of their 2-3-ton commercial vehicle chassis from £750 to £700. The change is made on all vehicles sold from March 20 until further notice.

The Premier Electric Welding Co., Ltd., with the object of increasing the efficiency of its organisation, proposes to concentrate a number of its departments in the London area. Arrangements are being made to transfer the head office, technical and research laboratories and electrode factory to Abbey Wood. All communications should now be addressed to the Premier Electric Welding Co., Ltd., Abbey Wood, London, S.E.2.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

WEEKLY TRAFFIC RETURNS.

COMMON FUND COMPANIES. Metropolitan District Rly. Co. .. London Electric Rly. Co. .. .. City & South London Rly. Co. .. Central London Rly. Co. .. .. London General Omnibus Co., Ltd.	Week ending March 18, 1922 ..	£220,159
	Corresponding week last year ..	227,665
	Decrease	7,506
	Aggregate from Jan. 1 to date ..	2,318,697
	Corresponding period last year ..	2,502,911
	Decrease	184,214
LONDON & SUBURBAN TRACTION GROUP Metropolitan Elec. Tramways, Ltd. London United Tramways, Ltd. South Met. Elec. Tr. & Ltg. Co., Ltd. Tramways (M.E.T.) Omnibus Co., Ltd Gearless Motor Omnibus Co., Ltd.	Week ending March 18, 1922 ..	£49,051
	Corresponding week last year ..	50,617
	Decrease	1,566
	Aggregate from Jan. 1 to date ..	504,894
	Corresponding period last year ..	544,528
	Decrease	39,634

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	Mar. 15	3,377	3,272	— 105	41⅞	146,169	— 12,395
„ Motor Buses	„ 15	53	142	— 89	41⅞	9,584	+ 8,280
Ayr Corporation ..	„ 18	549	496	— 53	44	30,980	— 2,310
Barrow Corporation ..	„ 18	884	607	— 277	50	40,758	— 4,371
Belfast City	„ 17	12,519	11,770	— 749	50	624,736	+ 50,517
Birkenhead Corporation	„ 12	2,590	2,550	— 40	48⅞	128,370	— 13,211
„ Motor Buses	„ 12	390	543	+ 153	48⅞	32,453	+ 12,201
Birmingham Corporat'n	„ 11	31,546	29,209	— 2,337	49	1,433,298	— 128,508
„ Motor Buses	„ 11	1,860	2,022	+ 162	49	96,421	— 2,412
Blackburn Corporation	„ 15	2,362	2,206	— 156	50⅞	119,134	— 11,148
Bradford Corporation..	„ 18	14,465	13,777	— 688	50	685,884	+ 8,934
Burnley Corporation ..	„ 18	3,316	3,246	— 70	..	..	..
Burton-on-Trent Corp.	„ 19	654	555	— 99	50	31,125	+ 267
Bury Corporation ..	„ 19	2,373	2,343	— 30	50⅞	121,708	— 5,618
Chatham & District ..	„ 9	1,593	1,490	— 103	10	14,097	— 1,656
Chesterfield Corporat'n.	„ 13	640	551	— 89	50	29,147	— 897
„ Motor Buses	„ 13	858	681	— 177	50	37,631	— 3,007
Derby Corporation ..	„ 18	2,301	2,025	— 276	50	107,460	— 7,943
Dundee City ..	„ 15	3,076	2,891	— 185	43⅞	137,981	+ 4,686
East Ham Corporation	„ 18	2,197	2,159	— 38	50⅞	106,507	+ 2,238
Edinburgh Corp. Trys.	„ 11	..	11,145	..	43	539,192	+ 3,759
„ Motor Buses	„ 11	..	3,202	..	43	151,997	..
Glasgow Corporation ..	„ 18	46,048	45,126	— 922	41½	1,875,599	— 1,249
Glossop (U.E. Sup. Co.)	„ 18	227	233	+ 6	11	2,530	— 22
Halifax Corporation ..	„ 14	4,326	3,895	— 431	48⅞	211,997	— 1,052
„ Motor Buses	„ 14	113	57	— 56	48⅞	3,787	— 1,784
„ Railless Cars	„ 14	..	53	..	34	1,788	..
Huddersfield Corporatn.	„ 18	5,299	4,939	— 360	51	263,348	+ 7,280
Ilford U.D. Council ..	„ 18	1,427	1,430	+ 3	50	75,183	+ 10,027
Ipswich Corporation ...	„ 18	848	737	— 111	50	42,644	— 5,308
Isle of Thanet ..	„ 15	572	589	+ 17	23	14,335	+ 1,098
Kilmarnock Corporat'n	„ 18	365	317	— 48	43⅞	15,610	— 615
Leicester Corporation..	„ 18	6,474	7,191	+ 717	11	78,566	+ 7,437
Liverpool Corporation	„ 18	32,568	29,260	— 3,308	11	315,604	+ 7,392
London County Ccl. ..	„ 22	102,314	90,820	— 11,494	51	4,955,024	+ 170,390
Maidstone Corporation	„ 16	420	402	— 18	49	23,297	— 605
Manchester Corp. ..	„ 18	37,333	37,734	+ 401	50	1,933,103	+ 181,003
Newcastle-on-T. Corp.	„ 18	11,357	strike	— 11,357	50	526,492	— 29,538
Nottingham Corp.	„ 16	7,574	7,424	— 150	50	344,993	— 40,678
Oldham Corporation ...	„ 19	4,531	4,534	+ 3	52	243,336	+ 2,670
Preston Corporation ...	„ 15	2,003	1,740	— 263	49⅞	94,547	+ 2,929
„ Motor Buses	„ 15	..	127	..	7⅞	983	..
Reading Corporation ...	„ 16	1,562	1,502	— 60	50	78,664	— 3,794
„ Motor Buses	„ 16	270	302	+ 32	50	16,796	+ 3,600
Rotherham Corporation	„ 20	2,625	2,133	— 492	50	112,912	— 20,942
Salford Corporation ..	„ 19	10,332	10,362	+ 30	49⅞	535,415	+ 20,699
Sheffield Corporation..	„ 19	20,411	18,241	— 2,170	50⅞	972,646	— 75,406
Southampton Corp. ..	„ 15	2,964	2,893	— 71	50	147,491	— 9,223
„ Motor Buses	„ 15	180	97	— 83	50	7,389	— 4,579
Southend-on-Sea Corp.	„ 22	1,733	1,930	+ 197	51	123,510	+ 8,447
South Shields Corp. ..	„ 18	1,897	1,680	— 217	51	85,307	— 11,741
St. Helens Corporation	„ 14	2,125	1,597	— 528	50	88,294	— 15,973
Sunderland Corp. ..	„ 19	2,864	2,401	— 463	50	130,353	— 22,086
Swindon Corporation..	„ 15	368	325	— 43	49⅞	19,306	+ 65
Tyneside Trys., Trds...	„ 15	1,157	688	— 469	11	8,394	— 3,804
Wallasey Corp. ..	„ 18	2,618	2,389	— 229	50⅞	138,543	+ 6,746
„ Motor Buses	„ 18	150	189	+ 39	50⅞	11,753	+ 3,237
Walsall Corporation ..	„ 18	1,885	1,632	— 253	50	82,293	— 9,231
„ Motor Buses	„ 18	1,240	917	— 323	50	46,935	— 12,738
Walthamstow U.D.C....	„ 18	1,933	1,838	— 95	50	100,676	— 1,065
Warrington Corp. ..	„ 16	1,071	987	— 84	50	49,958	— 601
West Ham Corp. ..	„ 16	6,143	5,678	— 465	50	293,874	+ 1,296
Wolverhampton Corp.	„ 22	2,275	2,160	— 115	51	118,445	— 4,276
„ Motor Buses	„ 22	603	627	+ 24	51	33,302	+ 8,987

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1920-21.	1921-22.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..	Mar. 18	£84,018	83,869	11	£910,895	+ 27,704
Ballarat & Ben. (4 wks.)	Jan. 1	5,342	5,565	40	45,852	+ 2,909
Brazilian Traction (Mlrs)	Jan.	12,875,000	15,032,000	4	15,032,000	+ 2,157,000
Brisbane	Jan.	46,280	48,790	4	48,790	+ 2,510
British Columbia $	Jan.	908,385	907,242	30	6,100,157	+ 174,401
Buenos Aires Lacroze ..	Feb.	53,952	55,227	34	460,044	+ 8,695
Burmah Tr. & Lght. Rs.	Feb.	48,405	52,380	9	403,127	+ 45,959
Calcutta .. Rs.	Mar. 18	83,051	101,866	11	1,156,119	+ 506,921
Cape Town	Feb.	..	26,980	..	..	..
Carthagena & Herrerias	Feb.	2,839	2,773	8	5,848	— 868
Cordoba	Jan.	18,696	22,152	43	230,068	+ 32,934
East India	Feb.	3,819	3,737	30	28,571	— 688
Kalgoorlie	Dec.	3,140	2,814	52	27,758	— 9,054
La Plata	Feb.	* 728	6,318	52	13,041	+ 5,806
Madras (2 weeks) Rs.	Mar. 15	41,016	49,857	10	243,457	+ 154,734
Manila .. .. $	Jan.	321,449	309,252	4	309,252	— 12,197
Montevideo	Feb.	48,119	48,111	17	180,301	— 11,462
Para	Feb.	20,545	21,582	13	67,208	— 1,821
Pernambuco	Mar. 19	4,219	3,670	11½	41,953	— 11,580
Port Elizabeth	Feb.	..	6,690	..	..	..
Rangoon .. Rs.	Feb.	120,718	130,583	8	268,433	+ 25,157
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Feb. 11	11,334	16,676	6	93,613	+ 31,671
Winnipeg .. $	Jan.	506,229	507,047	4	507,047	+ 818

* Strike of employees.

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LONDON, APRIL 1, 1922.

A QUESTIONABLE POLICY.

The action of Edinburgh Tramways Committee in recommending that contracts for rails should be given to German firms will not commend itself to many people as either wise or far-sighted. It appears that the Committee hope to save about £2,600 by passing over the lowest British tenders, but a little reflection would have made clear to them that there is a broader aspect of the matter which deserved consideration. To ignore British firms' quotations and to send the work abroad certainly does not tend to reduce the ranks of our unemployed nor the charge which their maintenance entails upon the ratepayers—those of Edinburgh included. The policy of the Tramways Committee amounts merely to saving money with one hand and paying out with the other. If they do not choose to allocate their money so that it will be transformed into British wages, then they must expect to continue to pay the much-criticised "dole." The effect of the Committee's action has not been lost on the working population of Edinburgh, one of whom very aptly sums up the situation in a letter to the local press. "Our Lord Provost is raising funds to help the unemployed," he says, "and our councillors want to send the little work we have to Germany. . . We, the citizens, pay for a tramway inquiry and send the work to Germany!" What is to happen if such a policy as this is allowed to go on? It is perfectly evident that, with the exchange against us, our manufacturers cannot compete with those on the Continent. To act on such lines as those recommended by the Edinburgh Committee is a policy of selfishness. Where the prices asked by our own manufacturers are fair, it is at least a question which should be seriously considered whether a Corporation is justified in sending contracts abroad in order to "save" two or three thousand pounds, especially in such times as the present. Edinburgh, for instance, might well recollect that, after all, it is due to British manufacturers that the city has any tramways at all, and if every tramways committee followed its example, progress in the development of electric traction in this country would soon cease. Foreign manufacturers are not likely to carry out experimental work in the interest of tramways for the benefit of British corporations in the same way as our own firms have done in the past. It is only to be expected that, so long as German firms can spare the time to fulfil British orders, they will "oblige"; but when they are sufficiently preoccupied with the work of their own countrymen we shall have to take second place. To regain and extend British trade will demand the co-operation of all classes, and it seems most unfortunate that a great Corporation like Edinburgh is to be found setting an example which, if followed, would bring disaster to both workmen and traders. It is to the credit of a smaller municipality, that of Hull, that they recently decided, when considering tenders for rails, not to discuss offers from Germany even though at a lower price, and their order accordingly went to Leeds. We do not for a moment believe that if the action of the Edinburgh Tramways Committee were submitted to the ratepayers they would allow the Town Council to confirm it.

THE VICTORY OMNIBUS COMPANY, Ltd.

This company has been formed for the purpose of extending the facilities for omnibus travelling in the streets of London. A contract has been entered into with Leyland Motors, Ltd., for the construction of the first fleet of 100 omnibuses, which will be of approved type embodying the latest improvements. Options have been obtained for the use of the Leyland Works, near Kingston, together with a trained staff, as a central repair depot, and also for garage sites at Lee Green, Stratford, Walham Green and Hanwell. Twenty-seven selected routes have been arranged, the majority of which will not compete with existing motor omnibus services. The company has secured the services, as chief traffic manager, of a gentleman who for many years has been employed in all branches of motor omnibus traffic in the Metropolitan area, while the services of Mr. Percy Frost Smith, late managing director of Tilling-Stevens, Ltd., have been retained as consulting engineer.

The capital of the company is £500,000, divided into 400,000 8 per cent. cumulative participating preference shares of £1 each, and 100,000 ordinary shares of £1 each. The directors are:—The Viscount Maitland, chairman of the Marine and Industrial Trust, Ltd., chairman; Sir Henry Bax-Ironside, director of the Westminster Electric Supply Corporation, Ltd.; Col. Alex. Weston Jarvis, director of Indiarubber, Guttapercha and Telegraph Works Co.; Sir Percy Sykes; and Mr. Ronald A. Mason (managing director), director of the British Steamship Marine and General Insurance Co., Ltd.

The prospectus is expected to be issued immediately after the Easter holidays.

EDINBURGH TRAMWAY INQUIRY OPENS.

CORPORATION'S CASE FOR OVERHEAD SYSTEM.

The inquiry by the Ministry of Transport into the application of Edinburgh Corporation to erect central standards in Princes Street when the tramways are electrified was opened in Parliament House, Edinburgh, on Wednesday. The considerable interest which the controversy over the famous street has aroused was manifested in the large attendance of town councillors and the public. The inquiry is being conducted by Sir William Marwood, K.C.B., and Colonel Pringle, of the Ministry of Transport. The interested parties were represented as follows: Mr. T. Graham Robertson and Mr. T. M. Cooper for the Corporation (instructed by the Town Clerk); Mr. J. Condie Sandeman, K.C., and Mr. D. P. Blades for the Citizens' Protection Committee, the Cockburn Association, the Scottish Commercial Motor Users' Association, the Automobile Association and Motor Union, the Royal Scottish Automobile Club and the Scottish Motor Trade Association; Mr. R. Candlish Henderson, K.C., Mr. Skelton and Mr. Guild on behalf of ratepayers and frontagers in Princes Street.

At the outset, Mr. Robertson mentioned that the Corporation's application to the Ministry was for permission to do two things—to erect centre poles in Princes Street and to alter the position of one of the sets of rails in that thoroughfare. Sir William Marwood observed that the terms of their appointment were to report to the Ministry in connection with tramway electrification in Princes Street, the application by the Corporation, and the objections lodged thereto.

Mr. R. S. Pilcher (general manager of the Corporation tramways), after giving the dimensions of the street, which is 1,300 yards long, said it was the avenue on which all the tramways converged. Seventy-five per cent. of the services would pass through Princes Street. Anything going wrong there would affect the whole system. Approximately 90 cable cars per hour travelled each way for 16 hours a day. With the electric system there would undoubtedly be a greater service. It was intended to use the smallest size of centre pole and the brackets would be as neat as possible. This would be quite attractive from the point of view of amenity. The centre poles would be 40 yards apart. In the whole length of Princes Street there would be 32 poles. The lights would be placed on the centre poles, and the present 38 lighting poles would be removed. They were higher and thicker than the proposed centre poles.

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The centre poles would be arranged so as not to interfere with traffic. They would, in fact, help to regulate traffic.

Mr. Pilcher spoke of the difficulties experienced with the present cable conduit which, he said, gathered all kinds of "scrap" from the roadway; the same trouble would be encountered if the electric conduit system were adopted. Experiments he had made showed that the Edinburgh cable conduit would not do for electrification purposes. A joint system (overhead wires and conduit) was inefficient and expensive. Mr. Pilcher also deprecated the idea of removing the tramway altogether from Princes Street, and said that the proposed George Street route (which runs parallel) was only for relief purposes.

At the resumed sitting of the Inquiry on Thursday, Mr. A. Baker, general manager of Birmingham Corporation Tramways, strongly recommended centre poles in a street of the width of Princes Street. With the lights transferred to the centre poles there would be a better lighting effect. The person who proposed the conduit system for such a thoroughfare—the heart of a great electric overhead system—"did not know what he was talking about."

Mr. James Dalrymple, general manager of Glasgow Corporation Tramways, said on a street over 50 ft. wide he would never suggest anything else than centre poles. He would never entertain the thought of conduit system or side tracks for Princes Street. Councillor Mancor, convener of Edinburgh Tramways Committee, said the overhead system was the only one which would prove efficient and economical. Centre poles would not affect the amenity of the street.

Sir John Cowan (chairman of Redpath, Brown & Co.) favoured the overhead system, and said that centre poles would not injure the amenity of Princes Street. Sir Robert Maule also preferred the overhead to the conduit system, and two representatives of Labour likewise condemned the latter method. This closed the case for the Corporation.

Councillor J. G. Guest, for the Scottish Commercial Motor Users' Association, said he could hardly believe anyone who had a knowledge of traffic conditions in Edinburgh would propose to put centre poles in Princes Street. There would be such congested traffic that accidents would be inevitable. Councillor W. J. Thomson, director and general manager of the Scottish Motor Traction Company, said centre poles would create a danger in Princes Street.

L.C.C. RAILLESS BILL.

APPROVAL OF BOROUGH COUNCILS TO BE REQUIRED.

On the motion for the second reading of the London County Council (Tramways, Trolley Vehicles and Improvements) Bill, on Thursday, Lieut.-Col. Pownall (Lewisham, E., C.U.) said the object of the Bill was to give powers to the London County Council to construct what was called a trackless trolley tramway from the Crystal Palace to Lee Green, and, as two thirds of the proposed tramway was to run through Lewisham, the inhabitants of that borough were strongly opposed to it, and the borough council condemned its introduction by 28 votes against eight. He, therefore, moved as an instruction to the Committee on the Bill to insert a provision making the erection of trolley vehicle equipment subject to the provisions of section 23 of the London County Council Tramways (Electrical Power) Act, 1900, which gave power to the local authority to veto the system of overhead tramway traction. Sir P. Dawson (Lewisham, W., C.U.), seconded the instruction. Sir A. Shirley Benn (Plymouth, Drake, C.U.) said that if the conduit system was adopted on the line projected it would mean an expenditure of £600,000, whereas the trackless trolley system would only mean an expenditure of £148,000.

After discussion, the instruction was carried by 86 votes against 72.

L.C.C. TRAMWAY MATTERS.

At the meeting of the London County Council, on Tuesday, several reports on tramway matters were received from the Highways Committee.

COMMITTEES.—As mentioned last week, Mr. Charles W. Matthews has been appointed chairman of the Highways Committee, and Lieut.-Col. A. C. H. Kennard has been appointed vice-chairman. Mr. Matthews has been appointed as the representative of the Highways Committee on the General Purposes Committee. Mr. G. H. Hume, J.P., has been appointed chairman of the Special Committee on London Electricity Supply, and Mr. R. C. Norman vice-chairman.

PAYMENT FOR WORK ON DECEMBER 27, 1921.—The Highways Committee recommended that payment at the rate of time and a quarter should be made to the tramway employees in respect of work done on December 27. The cost of the concession is £1,250. The Committee understood that ten municipal undertakings have decided to make this additional payment, and that 43 undertakings have not paid. After careful consideration of the matter, and in view of the fact that owing to Christmas Day having fallen on a Sunday, the employees received payment at a quarter rate for one day less than they would have done had Christmas Day fallen on a week day, the Committee came to the decision that the extra payment should be made.

THROUGH BOOKINGS DISCONTINUED ON ONE ROUTE.—The receipt of a communication from the London General Omnibus Company was reported intimating that owing to the poor receipts on the service of omnibuses from Charing Cross (Embankment) to Cricklewood, the service would be discontinued as from March 22. This withdrawal of the service involved the discontinuance of through bookings between points on the Council's tramways between Piccadilly and Oxford Circus, as there is no other direct service to these points from the Embankment. The Highways Committee pointed out that in their opinion the traffic was light on the omnibus service owing to the fact that the 1d. fare extended only to Charing Cross, a distance of about 300 yards.

THROUGH RUNNING WITH THE METROPOLITAN ELECTRIC TRAMWAYS, LTD.—The Highways Committee recommended that an agreement be made with the Metropolitan Electric Tramways, Ltd., for the withdrawal of all short running cars turning at Finsbury Park, and the substitution of through services; for the payment by the company to the Council of 10.5d. a car mile in respect of the car mileage run by the Council in excess of its proportion under existing through running arrangements; that the arrangement remain in force for six months, and be terminable on September 29, 1922, on one month's notice on either side, or thereafter on three months' notice on either side; and that the solicitor and general manager be empowered to complete the matter.

TRAFFIC RETURNS.—The Highways Committee submitted the traffic returns for the four weeks ended March 15, 1922, compared with the corresponding weeks in 1921. The total number of passengers carried during the four weeks was 55,980,957, an increase of 3,362,787. The traffic receipts aggregated £373,968, a decrease of £28,086, and the total traffic receipts from April 1, 1921, to March 15, 1922, showed an increase of £181,883 over the corresponding period of 1921. The Council now operates 155.91 route miles.

The electrical engineer of the tramways department has been re appointed as the representative of the Council on the London District Council (Area No. 10) of the Joint Industrial Council for the Electricity Supply Industry for the year 1922-23.

QUESTIONS IN PARLIAMENT.

MINISTER OF TRANSPORT.—Mr. Chamberlain, in the House of Commons on Monday, said that it would be necessary to appoint another Minister of Transport in succession to Viscount Peel, although the post would carry no salary.

LONDON ELECTRIC RAILWAY.—Mr. Young on Monday said that the details of the agreement between the London Electric Railway Company and the Treasury were not yet completed. The capital needed by the company would be raised by the public issue of debentures, and the rate of interest to be covered by the Treasury's guarantee depended on the terms on which that issue could be made.

COST OF LIVING FIGURES.—Sir M. Barlow gave the following increase in the cost of living figures as compared with the pre-war period:—Percentage increase in December, 1921, over 1914 (the latest month for which it had been computed for all countries): United Kingdom, 99; France (provincial towns), 249; Italy (Rome), 323; United States, 74; Germany, 1,450 (food, house-rent, fuel and light).

It was announced on Wednesday that the House will adjourn from April 12 to April 26.

MISCELLANEOUS NEWS AND NOTES.

Hull Tramway Profits.—The Hull City Council has adopted the recommendation of the Finance Committee that £10,000 of the tramway profits should be allocated to the relief of the rates.

Penny Fares Approved at Portsmouth.—The Town Council have endorsed the Tramway Committee's recommendations for a revision of fares, including the introduction of a penny fare for sections of about one mile.

Fifty Years with Leeds Tramways.—Mr. William Taylor, aged 70, has completed 50 years' service with the Leeds City Tramways, and the Committee have marked the occasion by a gift to him of £10. He was one of the three employees who became drivers of the first electric cars.

Chesterfield Railless Scheme.—For the completion of the overhead equipment and other apparatus required for the trolley omnibus installation and for the completion of certain tramways the Minister of Transport has extended till May, 1923, the time of the operation of the Chesterfield Corporation Acts, 1913-14.

Plymouth, Stonehouse and Devonport Tramways Company on March 18 celebrated the 50th anniversary of the inauguration of their service, which was originally conducted with horse-drawn cars. Mr. A. E. Maddock, the general manager, has been associated with the company since its formation, and succeeded the late Mr. G. H. Moreton in his present position.

Future of Singapore Tramways.—The Secretary of Singapore Electric Tramways, Ltd., states that an offer from the municipality of Singapore, for the purchase of the undertaking, was submitted to a meeting of debenture holders held on February 17 last, at which it was declined. Since that date negotiations with the Shanghai Electric Construction Co., Ltd., have been commenced and are now proceeding.

Tramway Councils.—At a meeting of the Metropolitan Municipal Tramways Council held on March 24, Mr. A. L. C. Fell, C.B.E., general manager of the London County Council tramways, was elected one of the representatives of the Metropolitan area upon the National Joint Industrial Council for the tramway industry, in succession to Mr. W. J. Squires, L.C.C., who recently resigned. At a meeting of the Lancashire and Cheshire Tramway Authorities Council on the same day Mr. J. M. McElroy submitted his resignation, which was accepted with regret. He was elected an honorary member, and Mr. J. Barnard, M.B.E., general manager of Bolton Corporation tramways, was unanimously elected a member of the Council in his place.

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Limburg Tramway Scheme.—H.M. Consul-General at Rotterdam has reported to the Department of Overseas Trade that the Limburgsche Tramways Mij is planning to construct a tramway system in South Limburg. The line will be 180 kilometres in length, and the estimated cost of construction is 15,000,000 gulden. Mr. A. P. Zuurendonk (Grasbroekenweg 4, Heerlen) is the technical manager, and the engineer is Mr. J. M. Meijer (Kruisstraat 26, Heerlen).

Leicester Tramways Extension.—The City Tramways Committee have decided to proceed immediately with the installation of the electrical equipment on the Welford Road route, and open the section for traffic at the earliest possible date. They point out that on May 26, 1914, the Council decided to construct the section. After the completion of the track and certain overhead equipment the works had necessarily to be suspended in consequence of the war.

Tramway Employees and the New Agreement.—Meetings of tramway employees throughout the country have lately been held, at which were considered the terms of the new National Agreement arrived at by the Joint Industrial Council on March 9. The Manchester men on Sunday last decided to accept the new terms though the Salford employees, meeting at midnight on Saturday, decided not to consent to them. (The full provisions of the revised March, 1919, Agreement were given in our issue of March 16, 1922.)

Railways and Road Traffic.—A second reading of the Railways (North Western and Midland Group) Bill was to be taken in the House of Commons on Friday evening. Mr. G. H. Roberts had given notice to move "That this House decline to proceed with the second reading of the Bill until the whole question of transport on the roads and railways of the country, and the conditions under which such transport should in future be carried on, has been considered and reported upon by some competent tribunal to be set up for the purpose."

A New Way of Handling Strikes.—A message from Monte Video states that the Senate has approved the project of two senators granting the Government the right to intervene in cases where transport strikes affect public services. In such an event the State is authorised to re-establish the service unless the concessionary companies themselves do so within 48 hours from the time of cessation of work. It will be recalled that the municipality of Monte Video recently seized the British-owned tramway undertaking after a strike of the employees and re-started the service.

Leeds to Consider Trailer Cars.—A special sub-committee of Leeds Tramways Committee, consisting of Aldermen R. A. Smithson (chairman), H. Brown (deputy chairman), A. Braithwaite, and Councillor Cornellan, will visit London next week to inspect the system of trailer cars on the L.C.C. tramways and other features of tramway equipment, including the "one-man" car which was introduced experimentally by the London United Tramways a short time ago. Trailer cars have already been tried in Leeds, but it is understood that the results were not very encouraging. They are being considered again as a possible means of relieving the pressure at rush-hours.

Lancashire United Tramways Coach Tours.—With the opening of the motor coaching season the Lancashire United Tramways, Ltd., of Atherton, have lost no time in making known to the public the extensive and well-organised system of coach tours which they conduct. Mr. E. H. Edwardes, the general manager, has just issued the 1922 edition of the Company's admirable little guide book, "Touring by Motor Coach," the price of which is now 1s. instead of 1s. 6d., as hitherto. Its one hundred pages contain attractive descriptions and photographs of many of the places of interest visited on the tours, and several excellent maps of the ground covered are also included.

Institute of Transport.—The sixth ordinary meeting of the current session will be held at the Institution of Civil Engineers, Great George Street, Westminster, S.W.1, at 5.30 p.m., on Monday, April 10, when a paper will be read on "The relation of civil engineering to transport problems," by Sir Alexander Gibb, G.B.E., C.B. (member), formerly Director-General of Civil Engineering, Ministry of Transport. The chair will be occupied by the President, Sir Henry P. Maybury, K.C.M.G., C.B. On Friday, April 21, at 5 p.m., at the Royal Society of Arts, John Street, Adelphi, W.C., Mr. J. K. Bruce will deliver a lecture entitled "The operation of a large tramway undertaking, with reference to capacity and cost under given conditions."

Remainder of Newcastle Strikers Return.—Most of the employees engaged in the power station and the car maintenance shops of Newcastle-on-Tyne Corporation, who had been on strike for a month, resumed work at the beginning of the week. After making repeated efforts to effect a settlement of the dispute, the Transport and Electricity Committee advertised on March 24 for new employees and received over 500 applications. Twenty of the men had been engaged when the Committee were informed that the regular employees were prepared to resume work. The strike, which originally involved about 240 men, was brought about by their refusal to work the hours recognised by their respective unions instead of the 44-hour week which the Town Council had decided to abandon. It will be remembered that the motormen and conductors, who had also been on strike for a similar reason, resumed work on Sunday, March 19.

Reconstruction of Chester Tramways.—The Chester Tramways Committee have again considered the report on the undertaking prepared by Mr. A. R. Fearnley (general manager of Sheffield Corporation Tramways), which was summarised in our issue of December 17, 1921. They also received reports from the City Surveyor and the Acting City Accountant. The Committee decided to recommend the Council (1) that the tramways be maintained as at present laid out for a further period of seven to eight years, at the end of which period the full life of the track will have been obtained; (2) that the recommendation set out in Mr. Fearnley's report be carried out, and that the City Surveyor be authorised to proceed with the work at a cost of £12,000, and report to the Committee as to progress from time to time, and that he be empowered to obtain the workmen, plant and materials necessary for the work; (3) that the cost of the work be defrayed out of the reserve fund of the tramways undertaking.

"Passimeter" System to be extended on London Underground.—The experimental "Passimeter" booking office at Kilburn Park Station (which was described in our issue of January 19, 1922) has been in operation for three months. The volume of traffic (inwards) handled at this station during this period exceeded half a million passengers, who, having passed through the passimeter, proceed direct to the trains without delay at the usual ticket examining barrier. It is found that 11 passengers per minute are dealt with by an old style booking office, and 13 by the new style at Kilburn Park. This is a saving of 16 per cent. in the time of passengers. Seventy per cent. of passengers require change, and this constitutes the major delay at booking offices. A machine will shortly be tried at Kilburn Park in which a push button labelled with the requisite change will be operated by the booking clerk, the machine instantly releasing the proper change, made up of shillings and pence as the case may be, into a convenient trough in front of the passenger. The Underground Company has decided to extend the passimeter system to ten additional stations.

New Turbo-Electric Locomotive.—For some time a turbo-electric locomotive has been in course of construction by Messrs. Armstrong, Whitworth and Company at Newcastle, to the designs of Mr. D. N. Ramsay, of the Ramsay Condensing Locomotive Company. The equipment of the engine consists of a boiler, a three-phase turbo-alternator, exhaust exciter turbo-generator, and electric motors, so that the machine is, in fact, a complete power station; and it recalls the Heilmann locomotive constructed by the Western of France Railway in 1893. According to the particulars given in the *Times*, the Ramsay locomotive has a length over all of 69 ft. 7 in., and weighs 130¼ tons, including coal and water. The boiler, the main three-phase turbo-alternator, and the exhaust exciter turbo-generator are placed in the front part of the locomotive. Steam is generated at 200 lbs. pressure, and 300° Fahr. superheat. Current is taken to four 275 h.-p. motors, two of which drive the front six-coupled wheels, and two the six-coupled wheels of the tender. Exhaust steam is led to the tender and to a condenser of special construction. The hot condensed water returns to the hot well and thence to the boiler.

FINANCIAL.

Hadfields, Ltd., announce a final dividend of 6d. per share, making 5 per cent. for the year (free of income tax).

Hastings and District Electric Tramways Co.—The report for 1921 shows a profit of £11,044, plus £1,000 brought in. The directors recommend payment of 1½ per cent., balance of arrears of preference dividend for 1919, dividend of 6 per cent. on preference shares for 1921, placing to depreciation £5,000, and carrying forward £1,044.

Cammell Laird & Co., Ltd.—A dividend is recommended on the ordinary shares of 5 per cent. for the year ended December 30 last, carrying forward £38,637. The additional capital created in 1920 now receives a dividend for the first time. In 1920 the dividend was at the rate of 7½ per cent., and the balance carried forward was £71,471.

Swansea Improvements and Tramways Co.—The surplus revenue for 1921 after deducting all expenses chargeable, including debenture interest, amount payable to Corporation in respect of tramways and light railways leased, and placing £20,000 to renewals, was £11,913, making, with £2,099 brought in, £14,012. The directors propose a dividend on the ordinary shares at 6 per cent., carrying forward £3,613.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended March 29 amounted to £90,509, a decrease of £12,431 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year) to March 29 (52 weeks) the total receipts were £5,045,561, an increase of £157,986 on the corresponding period of 1921.

W. T. Henley's Telegraph Works Co.—After providing for depreciation and debenture interest, the net profit for the past year amounts to £224,739, against £193,027 for 1920. The sum of £22,879 (against £18,432 last year) is placed to reserve, and the board recommends a balance dividend on the ordinary shares of 2s. per share, making 3s. per share, or 15 per cent., less tax, for the year, being the same as for 1920. The carry forward will be £260,243.

Stewarts & Lloyds, Ltd.—After providing for income tax and corporation tax, the board recommend a dividend on the fully-paid deferred shares Nos. 1 to 850,000 and Nos. 1,700,001 to 2,630,030 inclusive of 10 per cent. and a bonus of 2½ per cent., together 12½ per cent., tax free, for the year 1921. The deferred shares (fully paid from September 30, 1921), Nos. 850,001 to 1,700,000 inclusive, will receive a dividend to December 31, 1921, of 7½ per cent. and a bonus of 1⅞ per cent., both tax free. The sum of £70,000 is again set aside for depreciation, while £230,000 is placed to reserves, against £150,000 last year, £10,000 (same as a year ago) to employees' benefit reserve, and £180,000 carried forward, against £110,000 brought in.

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Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended March 18 give total receipts of £351,826, or £31,918 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £180 12s. 2d. per mile of single track, and last year at the rate of £196 19s. 10d., thus showing a decrease for the week of £16 7s. 8d. per mile open. Owing to a strike of the employees of Newcastle Corporation tramways there were no receipts on that undertaking, the services being entirely suspended. Of 51 undertakings, 48 show a decrease in earnings as compared with the same week last year.

Bristol Tramways & Carriage Co.—Progress in revenue is again shown in the report for the year ended December 31, 1921, while working expenses were somewhat lower. Revenue was £1,022,208, and working and general expenses and renewals £951,589, leaving with balance brought forward, together with an amount recovered on an adjustment of income-tax, a net revenue of £104,100. It is proposed to pay a final dividend on ordinary shares of 4 per cent., free of tax, making 7 per cent. for year, carrying forward £3,668. After charging expenses of issue of new ordinary shares and adjusting value of investments at December 31 last, the reserve fund amounts to £339,557. Receipts of tramways department show increase of £112,186, and carriage department decrease of £7,996. Number of passengers carried was 72,301,531, decrease of 12,681,903.

PERSONAL.

Mr. J. A. Forde, engineer and general manager of the Isle of Thanet Electric Tramways and Lighting Company, Ltd., has been appointed a Justice of the Peace.

Mr. Arthur Ellis has been asked by the Hull Corporation Electricity Committee to report on their electric supply undertaking from the technical and commercial point of view.

Mr. C. P. Sandberg, C.B.E., has been appointed by the Ministry of Communications of the Chinese Government, Pekin, as technical delegate at the International Railway Congress, which opens at Rome on April 18.

Mr. Ernest Hatton and His Resignation.—Newcastle City Council on Wednesday received a letter from Mr. Ernest Hatton (general manager and engineer of the tramways), referring to his resignation, tendered in a letter dated February 7. Mr. Hatton said he had received further medical advice, and had been given a more favourable report. After the short rest he was feeling somewhat better, and he therefore desired to be allowed to withdraw his resignation. On the motion of Alderman Sir Johnstone Wallace, Mr. Hatton's letter was referred to the Tramways Committee.

Mr. John C. Mitchell, F.C.I.S., who has been appointed a Justice of the Peace, joined the old London Road Car Company in his early youth, and ultimately was appointed secretary in 1905. On the amalgamation of the London omnibus companies in 1908 he was appointed secretary of the London General Omnibus Company. Later he became treasurer of the Underground Electric Railways Company of London, and its associated companies. He is a Fellow of the Chartered Institute of Secretaries, and has been president of the Institute. In 1912 he became a member of the Lambeth Borough Council, and for some years has represented that Council on the Metropolitan Water Board. During the war Mr. Mitchell was largely instrumental in organising local volunteers, and he has been president of the Norwood and Streatham Rifle Club. He is vice-president of the London Association for the Blind and governor of the Belgrave Hospital.

CONTRACTS.

Edinburgh Corporation Tramways Committee have recommended acceptance of the quotation of a German manufacturer in Cologne for 130 tons of tramway rails and 5 tons of fishplates. The German firm quoted, through their British agent, £1,365, and the nearest British offer was £1,495. Bailie Sleigh and Councillor Couston opposed acceptance of the foreign quotation. The Committee also unanimously agreed to accept the tender of another German firm for steel poles. The British quotation was £7,977, as against £5,436 by a Dusseldorf firm.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	Mar. 22	3,468	3,132	— 336	42½	149,301	— 12,731
„ Motor Buses	„ 22	57	132	+ 75	42½	9,717	+ 8,355
Ayr Corporation ..	„ 25	578	470	— 108	45	31,450	— 2,419
Barrow Corporation ..	„ 25	947	584	— 363	51	41,343	— 4,734
Belfast City	„ 24	12,515	11,317	— 1,198	51	636,053	+ 49,319
Birkenhead Corporation	„ 26	2,511	2,411	— 100	49½	133,266	— 13,445
„ Motor Buses	„ 26	519	515	— 4	49½	33,536	+ 12,357
Birmingham Corporat'n	„ 18	31,407	28,524	— 2,883	50	1,461,822	— 131,390
„ Motor Buses	„ 18	1,866	1,706	— 160	50	98,127	— 2,571
Blackburn Corporation	„ 22	2,414	2,135	— 279	51½	116,123	— 11,411
Bradford Corporation..	„ 25	14,152	13,758	— 394	51	699,642	+ 8,540
Burnley Corporation ..	„ 25	4,184	3,237	— 947	..	..	..
Burton-on-Trent Corp.	„ 26	676	550	— 126	51	31,675	+ 140
Bury Corporation ..	„ 26	2,961	2,235	— 726	51½	123,943	— 6,343
Chatham & District ..	„ 16	1,619	1,563	— 56	11	15,661	— 1,710
Chesterfield Corporat'n.	„ 20	630	528	— 102	51	29,675	— 999
„ Motor Buses	„ 20	834	669	— 165	51	38,300	— 3,172
Derby Corporation ..	„ 25	2,547	1,933	— 614	51	109,393	— 8,558
Dundee City ..	„ 22	3,047	2,809	— 238	44½	140,791	+ 4,448
East Ham Corporation	„ 25	2,308	2,055	— 253	51½	108,562	+ 1,984
Edinburgh Corp. Trys.	„ 18	..	11,232	..	44	550,424	+ 3,049
„ Motor Buses	„ 18	..	3,204	..	44	155,202	..
Glasgow Corporation ..	„ 25	46,458	43,326	— 3,132	42½	1,918,926	— 4,767
Glossop (U.E. Sup. Co.)	„ 25	290	206	— 84	12	2,736	— 106
Halifax Corporation ..	„ 21	4,210	3,819	— 391	49½	215,816	— 1,444
„ Motor Buses	„ 21	110	58	— 52	49½	3,845	— 1,835
„ Railless Cars	„ 21	..	48	..	35	1,836	..
Huddersfield Corporatn.	„ 25	5,520	4,874	— 646	52	268,223	+ 6,634
Ilford U.D. Council ..	„ 25	1,446	1,387	— 59	51	76,570	+ 9,937
Ipswich Corporation ...	„ 25	962	680	— 282	51	43,325	— 5,571
Isle of Thanet ..	„ 22	579	525	— 54	24	14,860	+ 1,044
Kilmarnock Corporat'n	„ 25	374	304	— 70	44½	15,914	— 685
Leicester Corporation..	„ 25	6,553	7,001	+ 448	12	85,567	+ 7,943
Liverpool Corporation	„ 25	29,649	29,559	— 90	12	345,163	+ 7,302
London County Ccl. ..	„ 29	102,940	90,509	— 12,431	52	5,045,561	+ 157,986
Maidstone Corporation	„ 23	446	380	— 66	51	23,676	— 671
Manchester Corp. ..	„ 25	38,985	35,864	— 3,121	51	1,968,967	+ 178,176
Newcastle-on-T. Corp.	„ 18	11,357	strike	— 11,357	50	526,492	— 29,538
Nottingham Corp.	„ 23	8,215	7,371	— 844	51	352,365	— 41,521
Oldham Corporation ...	„ 26	5,040	4,447	— 593	53	246,266	+ 3,053
Preston Corporation ...	„ 22	1,857	1,693	— 164	50½	96,240	+ 2,765
„ Motor Buses	„ 22	..	124	..	8½	1,107	..
Reading Corporation ...	„ 23	1,663	1,415	— 248	51	80,080	— 4,041
„ Motor Buses	„ 23	296	286	— 10	51	17,082	+ 3,590
Rotherham Corporation	„ 27	2,830	2,152	— 678	51	115,064	— 21,620
Salford Corporation ..	„ 62	10,821	9,891	— 930	50½	545,306	+ 19,789
Sheffield Corporation..	„ 26	20,269	17,959	— 2,310	51½	990,606	— 77,717
Southampton Corp. ..	„ 22	3,056	2,820	— 236	51	150,311	— 9,459
„ Motor Buses	„ 22	180	94	— 85	51	7,483	— 4,665
Southend-on-Sea Corp.	„ 29	2,904	1,938	— 966	52	125,449	+ 7,481
South Shields Corp. ..	„ 18	1,897	1,680	— 217	51	85,307	— 11,741
St. Helens Corporation	„ 21	2,016	1,524	— 492	51	89,818	— 16,465
Sunderland Corp. ..	„ 26	2,902	2,456	— 446	51	132,809	— 22,533
Swindon Corporation..	„ 22	370	318	— 52	50½	19,625	+ 13
Tyneside Trys., Trds..	„ 15	1,157	688	— 469	11	8,394	— 3,804
Wallasey Corp. ..	„ 25	2,600	2,298	— 302	51½	140,842	+ 6,444
„ Motor Buses	„ 25	153	201	+ 48	51½	11,955	+ 3,280
Walsall Corporation ..	„ 25	1,724	1,571	— 353	51	83,864	— 9,584
„ Motor Buses	„ 25	1,950	906	— 446	51	47,841	— 13,182
Walthamstow U.D.C....	„ 25	2,158	1,680	— 478	51	102,357	— 1,566
Warrington Corp. ..	„ 23	1,088	963	— 125	51	50,921	— 726
West Ham Corp. ..	„ 23	6,266	5,459	— 807	51	299,334	+ 489
Wolverhampton Corp.	„ 29	2,621	2,179	— 442	52	120,624	— 4,719
„ Motor Buses	„ 29	852	634	— 218	52	33,936	+ 8,769

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1920-21.	1921-22.	Wks.	Aggregate. 1921-22	In. or Dec.
Anglo-Argentine ..	Mar. 25	£72,461	86,720	12	£997,625	+ 41,973
Ballarat & Ben. (4 wks.)	Jan.	4,594	4,805	44	50,657	+ 3,120
Brazilian Traction (Mlrs)	Feb.	11,941,000	14,473,000	8	29,505,000	+ 4,689,000
Brisbane	Jan.	46,280	48,790	4	48,790	+ 2,510
British Columbia $	Jan.	908,385	907,242	30	6,100,157	+ 174,401
Buenos Aires Lacroze ..	Feb.	53,952	55,227	34	460,044	+ 8,695
Burmah Tr. & Lght. Rs.	Feb.	48,405	52,380	8	403,127	+ 45,959
Calcutta .. Rs.	Mar. 25	78,740	106,616	12	1,262,735	+ 534,797
Cape Town	Feb.	..	26,980	..	..	..
Carthagena & Herrerias	Feb.	2,839	2,773	8	5,848	— 868
Cordoba	Jan.	18,696	22,152	43	230,068	+ 32,934
East India	Feb.	3,819	3,737	30	28,571	— 688
Kalgoorlie	Dec.	3,140	2,814	52	27,758	— 9,054
La Plata	Feb.	* 728	6,318	52	13,041	+ 5,806
Madras (2 weeks) Rs.	Mar. 15	41,016	49,857	10	243,457	+ 154,734
Manila .. .. $	Feb.	306,389	310,001	8	619,253	— 8,585
Montevideo	Feb.	48,119	48,111	17	180,301	— 11,462
Para	Feb.	20,545	21,582	13	67,208	— 1,821
Pernambuco	Mar. 26	3,763	3,624	12½	45,577	— 11,719
Port Elizabeth	Feb.	..	6,690	..	..	..
Rangoon .. Rs.	Feb.	120,718	130,581	8	268,433	+ 25,157
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Feb. 18	12,751	15,147	7	108,760	+ 34,067
Winnipeg .. $	Jan.	506,229	507,047	4	507,047	+ 818

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

COMMON FUND COMPANIES. Metropolitan District Rly. Co. .. London Electric Rlv. Co. .. .. City & South London Rly. Co. .. Central London Rly. Co. .. .. London General Omnibus Co., Ltd.	Week ending March 25, 1922 ..	£210,322
	Corresponding week last year ..	227,360
	Decrease	17,038
	Aggregate from Jan. 1 to date ..	2,529,019
	Corresponding period last year ..	2,730,271
	Decrease	201,252
LONDON & SUBURBAN TRACTION GROUP Metropolitan Elec. Tramways, Ltd. London United Tramways, Ltd. South Met. Elec. Tr. & Ltg. Co., Ltd. Tramways (M.E.T.) Omnibus Co., Ltd Gearless Motor Omnibus Co., Ltd.	Week ending March 25, 1922 ..	£45,562
	Corresponding week last year ..	53,343
	Decrease	7,781
	Aggregate from Jan. 1 to date ..	550,456
	Corresponding period last year ..	597,871
	Decrease	47,415

	Passenger.	Goods.	Total.
METROPOLITAN RAILWAY			
Week ending March 25, 1922 ...	732,173	3,819	35,992
Total Receipts (12 weeks) ...	393,559	46,000	439,599
MERSEY RAILWAY			
Week ending March 25, 1922 ...	—	—	4,359
Total Receipts (12 weeks) ...	—	—	56,581

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THE
Tramway AND Railway World
FOUNDED IN 1892.

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LONDON, APRIL 8, 1922.

DECREASING TRAMWAY RECEIPTS.

This week the receipts of municipal tramways, tabulated in our usual return, complete the year. In the case of most corporations the position is, unfortunately, very different from that a year ago. In the concluding financial week of that year fifty-three undertakings reported an increase and only four a decrease. In the week ending March 25 of this year the position is almost exactly reversed, as only four undertakings show an increase in respect of tramways. In regard to total receipts for the year, about thirty corporation tramways last year showed an increase; this year, fifteen concerns report an increase. In the case of the great majority of them there is a large decrease in gross earnings. The result is, of course, mainly attributable to the depressed condition of trade and industry, although to some extent the fall may be traceable in cases to a decrease in fares. The effect has naturally been accentuated by numerous strikes. The decrease in receipts has no doubt been met in some measure by a reduction in working costs; but it is probable that the net result for the financial year will be much less satisfactory than in the previous year. Estimates of many corporation tramways show that large losses will have to be made good, and ratepayers in the coming year will have reason to appreciate the fact that even with municipal management ends must in some way be made to meet. In past years many of the undertakings have contributed considerable sums to the relief of the rates, and now that we have reached a lean period, the owners of the tramway systems must return some of their profit in order to keep the enterprises going. The reduction in wages which began last August was, it will clearly be seen, necessary, and the effect of it will be felt, together with the advantage to be derived from the latest agreement, in the coming year. The next year or two will afford the severest test that municipal tramway management has yet encountered. There is no doubt that in the past far too little attention has been paid to the future. Tramway committees have, as a general rule, been content to deal only with the present, and consequently liabilities have been accruing which will now have to receive early attention. The condition of the permanent way in many cases is far from satisfactory, and new rolling-stock is generally required. In numerous instances there are no funds available for improvements which are increasing in urgency from day to day. The question of adequate reserve funds is one to which the Municipal Tramways Association might well devote its attention. The temptation to use tramway profits for the relief of the rates is always present, and it is only by pointing out clearly and continually the inevitable demands for reconstruction and renovation which a tramway has to meet that members of public authorities can be impressed with the necessity of pursuing a sound financial policy.

"A QUESTIONABLE POLICY."

To the Editor of the TRAMWAY AND RAILWAY WORLD.

SIR,—With reference to the editorial comment in the current issue of your supplement, I think that as a question of important principle is involved it would be somewhat fairer if, at any rate, you made passing comment on both sides of the question. The entire subject relating to the placing of any orders abroad, irrespective of which foreign country executes them, is one which at all times is open for wide debate and conflicting opinions, but it appears to me that you argue that, quite irrespective of the financial considerations, no orders should be given to Germany in particular. If Germany is not allowed to trade with other countries, and Great Britain in particular, how is she ever going to pay off her war liabilities?

Furthermore, do you realise that Germany has to pay to our Customs Authorities, in cash, before the importation of her manufactured goods into the United Kingdom is allowed, 26 per cent. of the value of same? All such payments go into the National Exchequer, out of which the "doles" are paid to the unemployed. Quoting from your own published figures, the Corporation of Edinburgh, by their intended purchases from Germany of rails and poles, propose to save £2,671 of their ratepayers' money, and at the same time enrich the National Exchequer by the sum of £1,768, and I think you might enlighten your readers on this point by publishing this letter.

The total of these two amounts, viz., £4,439, is equivalent to a £1 weekly dole for one year to over 40 men, and the circumstances are not altogether or even partly accounted for by the depreciated German currency, for the very simple reason that the German Government does not grant export licences for any goods unless the price is at least equivalent to the prevailing Home trade price in Germany.

In conclusion, it should also be borne in mind that Germany has been, and is still, purchasing considerable quantities of scrap steel, pig iron, and various manufactured goods from this country, and if we do not buy from them, it must be obvious that they cannot purchase anything from us.—Yours faithfully,

FRANK MOTT.

Billiter Square Buildings, London, E.C.
April 4. 1922.

Our correspondent appears to be somewhat concerned with the interests of Germany. The comment we made last week was directed to the question in general. The re-establishment of the industrial position in this country is the first requisite, and anything which conflicts with that policy must, as was suggested in our note, become a question for "serious consideration." We are convinced that every ratepayer would be willing that his Corporation should pay a higher price for goods made by British labour, and the action of Edinburgh Town Council on Thursday last in diverting the contract in question to a firm in this country confirms our opinion. The question is, of course, one of much complexity, but in the present condition of unemployment we cannot afford to neglect any reasonable means of providing our own people with useful work.—ED., T. AND R. W.

BRIGHTON CORPORATION TRAMWAYS.

THE MANAGEMENT COMMENDED.

Mr. W. B. Keen, of Messrs. W. B. Keen and Company (chartered accountants), was requested some time ago by the Brighton Tramways Committee to investigate and report upon the undertaking, specially with a view to ascertaining whether any economies could be effected in the general working expenses. In his report, Mr. Keen deals at some length with the points on which he was asked to report. With regard to the remuneration of the clerical and administrative staff, he finds that the Corporation are not paying excessive salaries. The increase in the present salaries over those of 1914 averages about 191 per cent., and a large portion of this increase represents bonuses granted under the Civil Service scale, which is now being readjusted periodically according to the cost of living. The increase in the wages of employees is attributable mainly to the reduction of working hours to 48 per week. More work has also been necessary on repairs to cars and the permanent way, due to the increasing age of the undertaking. In comparison with other similar undertakings, the position at Brighton does not appear unfavourable at the present time.

As regards fares, Mr. Keen finds that the fares, which were not increased until April 1, 1919, correspond with the heavy increase in expenditure. The increases were only made on the basis of 1d

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per mile, although a larger increase would have been permissible. He considered that the withdrawal of 1d. fares had not adversely affected the present financial position.

Inquiry into the price paid for electric energy shows that the tramways have been paying to the Corporation a comparatively high price for energy. In 1913-14 the average price charged to power consumers was .999d. per unit, but the tramways were charged 1.20d. per unit. In 1920-21 the average price to power consumers was 2.33d., and the tramways were charged 2.11d. per unit. Until that year the Tramways Committee were charged much more per unit than was charged the average power consumer, and at the present time the tramways department pays 2¼d. per unit, while other power consumers are charged at the average of about 2⅛d. per unit. Mr. Keen feels that the Committee is justified in asking for a reduction in the price charged.

In discussing depreciation in addition to sinking fund, Mr. Keen thinks that it is sound finance to provide a sum annually towards renewing any of the assets as and when the life of its term has expired, and thus to obviate the necessity of re-borrowing. Commenting on the fact that a sum of £2,000 is received annually by the Corporation for a licence granted to the Omnibus Company by the Watch Committee to run omnibuses in the borough, Mr. Keen observes that as these omnibuses are naturally a source of severe competition to the tramways, especially where the routes are over the same roads, it is a question for the Council to consider whether the tramways ought not to receive credit for at least a part of the money received in respect of the licence. In concluding his report, Mr. Keen says that in his opinion the undertaking as a whole is financially sound, and is in no worse position than the majority of tramway undertakings at the present time; and he adds tha the thinks the undertaking is very efficiently managed.

L.C.C. TRAMWAY MATTERS.

At the meeting of the London County Council on Tuesday, the Highways Committee presented reports dealing with through running on the London United tramways and the Transport Workers' Agreement.

THROUGH RUNNING ON THE LONDON UNITED TRAMWAYS.

Under a resolution of the Council of February 28, 1922, it was decided that an agreement should be made with the London United Tramways, Ltd., by which in place of running cars over the Hammersmith lines of that company, the latter should continue to work those lines, but the Council should have running powers over the company's lines to Wimbledon (as reported in our issue of March 4). In accordance with an agreement made in December, 1917, for the purchase of the London United Tramway Co.'s lines in London, the company undertook for a period of 21 years to provide, free of cost to the Council, a sufficient supply of direct current for the cars running on the purchased tramways up to 1,800,000 units in any one year, the Council agreeing to pay for any power in excess of that amount. When the agreement was entered into it was not anticipated that the Council would, in lieu of operating the Hammersmith lines, work another portion of the company's system. The Highways Committee, having considered the matter in relation to the agreement in respect of through running to be entered into under the resolution of February 28, 1922, proposed as a reasonable alternative to the provisions of the 1917 agreement the following arrangement:—The company to supply power free of cost up to 1,800,000 units to the Council's cars running over the Hammersmith lines or any part of the company's system, and, in addition, to continue at their own expense to supply the current necessary for their own services worked over the Hammersmith lines. In case of failure of the company to supply the necessary power the Council may supply it at the expense of the company. The arrangement will continue so long as the through running agreement is in force.

TRAMWAY EMPLOYEES' WAGES.

On the recommendation of the Highways Committee, the Council adopted the terms of the agreement dated March 9, 1922, of the National Joint Industrial Council for the tramways industry. This provides that the guaranteed week of 48 hours shall be retained for all employees who are entitled to that guarantee at the date of the previous agreement, viz., March 20, 1919, but that in the case of new entrants into the service of any undertaking, the guarantee is to be for a week of not less than 32 hours, to be completed within six days, provided that the number of employees who are not to be guaranteed a week of 48 hours is not to exceed 10 per cent. of the total number employed. Any privileges or conditions of service enjoyed under the previous agreement may be discontinued six months after the new agreement comes into force, provided that the employees have not come to a local agreement, nor satisfied a Committee of the National Council that they are entitled to a continuance of such privilege, emolument or conditions of service. Failing agreement by such a Committee, an independent person shall be appointed with power to modify or decide. Permanent way employees are excluded from the provisions of the new agreement, but pending negotiations for the provision of a new agreement for them, the conditions of the March, 1919, agreement are to continue until May 1, 1922. The new agreement becomes effective as from the first full pay period after April 17, and is to be terminable upon three months notice on either side.

METROPOLITAN MUNICIPAL TRAMWAYS COUNCIL.

Mr. W. J. Squires having ceased to be a member of the Council, at the suggestion of the Highways Committee the Council appointed the Chairman and Vice-Chairman for the time being, and the General Manager of the tramways department (Mr. A. L. C. Fell) to represent the Council on the Metropolitan Municipal Tramways Council.

FINANCIAL POSITION OF THE TRAMWAYS.

In his report on the accounts for the year ended March 31, 1921, the District Auditor states that the total income on revenue account amounted to the sum of £4,904,427, and the total working expenses were £4,623,654, showing a surplus on working of £280,773; deducting from this figure the net cost of renewals, *viz.*, £215,639, a credit balance is carried to net revenue account of £65,134. After providing for debt charges (£590,665), income tax (£125,000), interest on overdrafts (£23,322) and other small charges the deficiency for the year which is required to be met out of the special county rate is £590,579. There was an increase during the year in revenue receipts of £608,581 attributable, to the extent of £600,965, to larger passenger traffic receipts. On the other hand the expenditure showed an increase of £942,755 over 1919-20, being higher under all heads, especially salaries and wages (£581,717), and repairs (£184,653), due to the higher prices of materials and increased cost of transport and labour. Since the inception of the undertaking in 1897, the net contribution out of the rates to meet the deficiency has been £315,802. The deficiency would have been larger but for the adoption of two important changes in financial policy, *viz.*, (1) the transfer of one-half the cost of renewals of track work from revenue to capital to be treated as repayable within twelve years, and (2) the repayment of outstanding debt charges on the basis of a 3½ per cent. cumulative annuity system, instead of the instalment system, the latter arrangement involving the postponement of charges upon the revenue of future years.

MISCELLANEOUS NEWS AND NOTES.

Motor Car for Edinburgh Tramway Committee.—Edinburgh Corporation Tramways Committee recommend the purchase of a motor landaulette for the use of members and officials.

More Omnibuses for Wallasey.—Wallasey Tramways Committee proposed to purchase four additional motor omnibuses from the Liverpool Corporation for £1,700 (£425 each), the cost to be charged to the tramways reserve fund.

Leeds Tramways and Coal Transport.—It is reported that Leeds Tramways Committee are considering a scheme for conveying coal to industrial establishments in the suburbs by tramway, as existing cartage rates are a heavy burden on manufacturers.

Removal of Centre Poles in Glasgow.—A joint meeting of Glasgow Corporation Statute Labour, Tramways, Watching and Lighting Committees have recommended the removal of the central tramway standards in Great Western Road to the side of the thoroughfare.

Steel Workers' Wages.—The craftsmen employed at the South Wales Steel Works have agreed to a reduction of 5s. a week in wages, which will bring the earnings of fully qualified journeymen down to £3 5s. for a 47-hour week. This scale is to be effective for six months.

Newcastle-Gateshead Tramway Route.—A commencement has been made with the laying of a new route of Newcastle-upon-Tyne Corporation Tramways from Barras Bridge to Gateshead, via Percy Street and the High Level Bridge. The work is being carried out by the City Engineer's Department.

Ayr Tramway Improvements.—The Commissioners sitting in Glasgow to consider various Provisional Orders sought by municipalities, received an application from the Burgh of Ayr in respect of tramway extensions and street widenings to permit of the doubling of track. These clauses of the Order were approved.

Kinematograph in Edinburgh Controversy.—With the object of illustrating the practicability of the conduit system in view of the controversy over the type of tramway equipment to be used in Princes Street, Edinburgh, the local Citizens' Protection Committee have exhibited to the public a film showing the London conduit lines in use.

Increasing Popularity of the One-Man Car in the U.S.A.—One of the most recent pronouncements in favour of the one-man car is that of the United Electric Railways of Providence, Rhode Island, who propose to use one-man safety cars on one city and seven suburban routes. New cars will be purchased and some old cars converted to the one-man operation.

Aberdeen Tramways' New Offices.—The Corporation Tramways Committee have decided to lease the upper floors of the large building of the Union Bank of Scotland, at 53, Castle Street, for use as offices. The annual rental will be £270. It was also agreed to purchase the property in Marischal Street that adjoins the bank. This is to be utilised as offices for dealing with conductors' cash, the issuing of tickets, etc.

Managership of Manchester Tramways.—The special sub-committee of Manchester Corporation Tramways Committee, which was appointed in connection with administrative matters, has been authorised to deal with the applications for the appointment of general manager. The sub-committee will make a selection out of the applications, and submit the names for the consideration of the full committee.

Sheffield Tramway Extensions.—The extensions to Sheffield Corporation Tramways at City Road and Ecclesall are being rapidly completed. At Ecclesall the track is being extended by a double line to Abbey Lane, and the work may be finished by Easter. The City Road extensions are expected to be completed by May. About 300 men are employed on both schemes, which are being carried out by the City Surveyor's Department.

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Licences for Motor Coaches.—Blackpool Watch Committee have authorised the chief constable to require motor coaches plying for hire from private premises to be licensed by the Committee. The local Motor Coach Owners' Association having asked that coaches should be allowed to stand in public thoroughfares from which the coaches ply for hire, the Committee have adhered to their previous decision requiring such vehicles to be run from private premises.

Proposed Penny Fares at Cardiff.—Cardiff Tramways Committee have instructed the general manager (Mr. R. L. Horsfield) to prepare reports on the reintroduction of penny fares and on special fares for children. A special sub-committee reported that an offer of £6,500 had been made on behalf of the Corporation for the purchase of the Cardiff Tramway Co.'s system of omnibuses between Cardiff, Llandaff and Whitchurch. The offer had been declined, and the committee resolved to make a further one, failing acceptance of which the matter be referred to arbitration.

British Standard Rails and Fishplates.—British Engineering Standards Association has just issued the revised British standard specification and sections for tramway rails and fishplates, Report No. 2-1922 (price 1s.). Alterations which experience has shown to be desirable to meet present-day requirements are included, together with two new sections, viz., B.S. Section No. 8, which is a special heavy section designed for use where exceptional traffic is encountered, and B.S. Section No. 9, a rail primarily intended for inter-urban tramways employing sleeper construction.

T.O.T. Philharmonic Society.—The Central Hall, Westminster, was crowded on Tuesday evening with friends of the staff and employees of the Underground Company who form the T.O.T. Philharmonic Society. The occasion was the seventh evening concert given by the 300 members of the band, choir and orchestra. The programme submitted was a more searching test of the capabilities of the united performers than at any previous concert, and on the whole it may be said that they responded with credit to the higher standard set by Mr. C. F. Lambert, their new conductor-in-chief. While the programme did not neglect classical items, lighter selections found due recognition. The enjoyment was enhanced by the appearance of outside artistes of merit—Miss Dorothy Greene, Mr. E. Dykes, and Mr. N. Long (humorous entertainer).

Omnibus Powers for Glasgow Corporation.—The Parliamentary Commission which has been sitting in Glasgow to consider a number of Provisional Orders promoted by local authorities, devoted considerable time to that of Glasgow Corporation. This includes clauses providing for the establishment of omnibus services in the city and within a ten mile radius beyond the tramway termini. There was no opposition to the proposals regarding powers within the city, but in respect of those beyond the boundary, objections were made by various interests, including private motor service proprietors and railway companies. The Commissioners found the preamble proved as regarded general powers, and in respect of two only of several specified routes beyond the city. They also decided in favour of inserting the "model clause" under which the Corporation will be prohibited from manufacturing omnibuses.

Birmingham Motorman's Compensation.—At Birmingham County Court recently a former Corporation tramcar driver, aged 64, applied under the Workmen's Compensation Act for the restoration of a weekly payment. Counsel for the applicant said in November, 1915, he was seriously injured in a tramway accident, and was treated by a doctor until July, 1916. Up to June 19, 1916, he was paid 19s. a week compensation. Payment ceased upon an agreement for a declaration of liability being recorded. The applicant resumed work under the Corporation until January 15, 1922, when he reported sick. The applicant's case was that at present, in consequence of the accident, he was incapacitated from work, and medical evidence was called. The respondents denied liability on the ground that any incapacity was not due to the accident. The Judge awarded compensation of 20s. a week, with the usual war additions.

Proposed New Light Railway at Newcastle.—The Ministry of Transport held an inquiry at Newcastle-upon-Tyne on March 31, as to the expediency of granting the application made to the Ministry in February, 1922, by the Corporation, to amend the Newcastle Corporation Light Railway Order by including an additional railway (No. 2). This would be an extension of the Gosforth Park Light Railway, which was the subject of an application in May, 1921. The line would be situated near the western boundary of the city, and would, in conjunction with Tramroad No. 2, now in course of construction, form a means of tramcar communication to the centre of the city for passengers from the west and south-west. The length is six furlongs, and the estimated cost of the permanent way, together with sidings and junctions, is £7,650. The total estimated cost of construction and of acquisition of land and buildings, is £13,564.

"The Tramway and Light Railways' Association Journal" for April contains the full text of the agreement made between the representatives of the employers and employees in the National Joint Industrial Council for the tramway industry, regulating the hours of labour and conditions of service of the employees on the operating and maintenance staff. It is stated that at the meeting of the members of the Conference of Tramway and Light Railway Companies held on March 21, 1922, it was decided by a majority of those voting to recommend to the companies concerned the adoption of the agreement. The issue also contains the revised scheme which has been issued by the Board of Inland Revenue of annual allowances for income tax purposes for wear and tear of the permanent way. This scheme was prepared after consultation with representatives of the Municipal Tramways Association, the Tramways and Light Railways' Association, and the Institute of Municipal Treasurers and Accountants.

Conclusion of Edinburgh Tramways Inquiry.—The public inquiry which has been held on behalf of the Ministry of Transport at Edinburgh in reference to the application by the Corporation to erect centre poles in Princes Street when the tramways are electrified was concluded on Saturday last. (A summary of the two previous days' proceedings appeared in our issue of last week.) Lord Johnston, an old resident of Edinburgh, opposed the erection of centre poles on the ground that they would inconvenience traffic and interfere with the amenity of the town. Lord Salvesen, who has been a member of the Cockburn Association for 20 years, and is chairman of the Citizens' Protection Committee, emphasised that the great volume of protest raised against the scheme had been ignored by the Town Council. He advocated the electric conduit system. Other witnesses urged the adoption of conduit equipment, and Professor Wallace suggested that the tramway track should be laid along the south side of the street.

Fate of the L.C.C. Railless Scheme.—Mr. G. H. Hume, of the London County Council, says that by the decision of the House of Commons to instruct the Committee dealing with the Bill to insert a proviso giving the borough councils the right to veto schemes of the Council for the construction of railless trolley lines, the Bill has been killed. As showing how difficult the position of the Council is, Mr. Hume alluded to the ability of the Omnibus Company to develop its services without requiring Parliamentary sanction. The railless proposal, it will be remembered, was to construct a railless route from the vicinity of the Crystal Palace to join the tramway system at Lee Green, thus linking up a dead end. The line would run through a housing estate and give a much-needed connection between the south-east and south-west. Mr. Hume added that, as this was the only Bill promoted by the Council this year, it seemed as though the development of the tramway system had been completely blocked.

Revision of Edinburgh Tramway Fares.—The conversion from the cable to the overhead electric system of the Pilrig-Nether-Liberton route of Edinburgh Corporation Tramways is expected to be completed during the next few weeks. Considerable alterations in the services and fare stages will be involved by the running of electric cars from Leith to Nether-Liberton, and the general manager (Mr. R. S. Pilcher) presented a report on the matter to the Tramways Committee on March 27. With regard to fares, he points out that on the Leith system there are at present 1½d., 2½d., 3½d., and 4½d. stages, while on the Edinburgh system these stages are not used. It is advisable, he states, to make the stages on the combined system as similar as possible, and he suggests that the stages which involve halfpennies should be abolished, and that the existing Leith stages should be slightly lengthened to compensate for this. The net result of the changes proposed is that the Leith 1d. stages are lengthened from 931 yards to 1,231 yards, and the through passengers to and from Leith will, in most cases, have the fares reduced a penny.

PERSONAL.

Mr. Johnstone Wright, deputy borough electrical engineer of Bradford, has been appointed electrical engineer and business manager of Belfast Corporation electricity undertaking, at a salary of £1,400 per annum.

Mr. W. J. Gray, late of the Goodyear Tyre and Rubber Company, Ltd., has now joined Messrs. Leo. Swain and Company, Ltd., as tyre department representative for the Fylde and East Lancashire districts.

Newcastle-upon-Tyne Transport and Electricity Committee have accepted the withdrawal by **Mr. Ernest Hatton** of his resignation as engineer and general manager of the city tramways. As was stated in our issue of last week, Mr. Hatton's decision to reconsider his resignation was taken in view of his improved health.

Mr. Harry A. Blackburn, M.I.E.E., has been appointed rolling stock superintendent of the Plymouth Corporation Tramways, and took over his duties on April 3. Since he was demobilised, Mr. Blackburn has been attached to the staff of the Metropolitan-Vickers Electrical Company, Ltd., Trafford Park, Manchester. He is the only son of Mr. A. A. Blackburn, M.I.E.E., M.I.Mech.E., general manager and engineer of the Huddersfield Corporation tramways, and formerly chief engineer of the Belfast City Tramways.

FINANCIAL.

Rangoon Tramways Capital.—It is proposed to increase the capital of the Rangoon Electric Tramway and Supply Company to £800,000 by the creation of 300,000 new shares of £1 each.

Torquay Tramways Company, Ltd.—The report for the year ended December 31, 1921, states that the profit on the tramways was £26,397, and adding to this the profit on the motor omnibuses, interest on investments, and transfer fees, there is a total of £36,178. After necessary deductions there remains a balance of £29,578. To this has to be added £436, brought forward from 1920, making a total of £30,014. The directors have recommended a dividend of 8 per cent., free of income tax, and a carry-forward of £2,206. These results have been obtained without having to increase fares, which are still on a pre-war basis. The progress of the motor omnibus undertaking has been maintained, and the profit earned for the year was £8,188.

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L.C.C. Traffic Receipts.—The traffic receipts for the week ended April 5 amounted to £92,244, a decrease of £11,180 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152,26 a year ago. From April 1, 1921 (the commencement of the financial year), to April 5, 1922 (52 7/7 weeks), the total receipts were £5,072,663, an increase of £157,752 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended March 25 give total receipts of £350,664, or £36,244 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £180 0s. 3d. per mile of single track, and last year at the rate of £198 12s. 3d., thus showing a decrease for the week of £18 12s. per mile open.

Llanelly and District Electric Lighting and Traction.—The result of the past year's working shows improvement as compared with former years, the annual report states. The net profit amounted to £24,553, as compared with a balance of revenue amounting to £15,975 for 1920. General reserve receives an allocation of £4,500, as compared with £2,500 at this time last year, and the dividend on the ordinary shares is maintained at 7 per cent. (less tax) for the year. The balance of £472 now carried forward compares with a sum of £1,341 brought into the accounts. The power business continues to develop satisfactorily, and the new plant recently installed is being used to its full capacity.

Hastings & District Electric Tramways Co., Ltd.—The report for the year 1921 shows a profit of £11,044. Adding to this the amount brought forward, there is an available balance of £12,044, which the directors recommend should be appropriated as follows:—Payment of 1½ per cent. balance of arrears of preference dividend for the year 1919; dividend of 6 per cent. on preference shares for 1921; to depreciation account, £5,000; to carry forward to next year, £1,044. The installation of the overhead system of traction on the Front line has been practically concluded. At the annual meeting held in in London the chairman (Mr. G. Kitchin), in moving the adoption of the report, congratulated the general manager and electrical engineer (Mr. W. Vincent Edwards), on the installation, under his direction, of the Front line equipment.

CONTRACTS.

Blackpool Tramways Committee have authorised a sub-committee to purchase a double deck motor omnibus.

Dundee Electricity Committee have accepted tenders from the British Thomson-Houston Co. for converting plant at £16,927, and switchgear at £1,413 11s.

Ilford Tramways Committee recommend acceptance of the tender of the Peckham Truck and Engineering Co. for the supply of 1½ miles (3,318 lbs.) of trolley wire at 10¾d. per lb.

Hull Tramways Committee have recommended acceptance of the tender of Walter Scott, Ltd., Leeds, for 30 tons of fish plates at £17 10s. per ton, and 14½ tons of sole plates at £17 10s. per ton.

Salford Tramways Committee have accepted the following tenders—Equipment & Engineering Co. for destination curtains at £164: Brown, Bayley's Steel Works, Ltd. for tyres and springs at £734 14s.; National Rail & Tramway Appliances Co. for brake blocks, £620; Anti-Attrition Metal Co. trolley wheels, axles, keeps and bearings, £100 0s. 10d.; P. R. Jackson & Co., armature coils, £347 7s. 11d.

Halifax Tramways Committee have accepted the following tenders: British Mannesmann Tube Co., Ltd., London, for the supply of 36 tramway poles at £11 5s. 9d. each; Alfred Wiseman, Ltd., Birmingham, for 36 tool steel pinion wheels, at 19s. 6d. each; Wm. Muir & Co., Ltd., Manchester, for 36 tool steel pinion wheels, at 16s. each; Edward Le Bas & Co., London, for 2 miles of 3/0 round trolley wire, at 9s. 1d. per lb.

Edinburgh Declines German Tenders.—Edinburgh Town Council on Thursday evening declined to confirm the Tramways Committee's proposal to award contracts for rails and standards to German firms (as mentioned in our issue of last week). They decided to allocate the contracts as follows: for the supply of 130 tons of rails and five tons of fish plates, Dorman, Long & Company, Middlesbrough; for the supply of steel poles, Stewarts & Lloyds, Ltd., Glasgow.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or −	Aggregate. Wks.	1921-22.	+ or −
Aberdeen Corporation	Mar. 29	3,481	3,154	− 327	43¾	152,456	− 13,059
„ Motor Buses	„ 29	63	143	+ 80	43¾	9,860	+ 8,435
Ayr Corporation ..	April 1	665	461	− 204	46	31,912	− 2 622
Barrow Corporation ..	„ 1	943	580	− 363	52	41,923	− 5,097
Belfast City	Mar. 31	12,551	11,565	− 986	52	647,618	+ 48,333
Birkenhead Corporation	April 2	2,771	2,512	− 259	¾	710	− 419
„ Motor Buses	„ 2	595	553	− 42	¾	195	− 70
Birmingham Corporat'n	Mar. 25	30,410	27,691	− 2,719	51	1,489,514	− 134,109
„ Motor Buses	„ 25	1,932	1,589	− 343	51	99,716	− 2,915
Blackburn Corporation	„ 29	3,711	2,173	− 1,538	52½	116,123	− 11,411
Bradford Corporation..	April 1	16,364	13,286	− 3,078	½	3,028	+ 2,329
Burnley Corporation ..	„ 1	3,666	3,099	− 567	..	..	..
Burton-on-Trent Corp.	„ 2	681	547	− 134	52	32,079	+ 42
Bury Corporation ..	Mari 31	1,427	1,457	− 30	52¾	125,401	− 6,312
Chatham & District ..	„ 23	1,716	1,407	− 309	12	17,068	− 2,019
Chesterfield Corporat'n.	„ 27	711	529	− 182	52	30,204	− 1,181
„ Motor Buses	„ 27	1,018	665	− 353	52	38,965	− 3,525
Derby Corporation ..	April 1	2,609	1,960	− 649	52	110,918	− 8,662
Dundee City ..	Mar. 29	3,251	2,808	− 443	45¾	143,600	+ 4,006
East Ham Corporation	April 1	2,254	2,131	− 123	52¾	110,294	+ 1,692
Edinburgh Corp. Trys.	„ 1	..	11,147	..	46	572,704	− 40,212
„ Motor Buses	„ 1	..	3,185	..	46	161,530	..
Glasgow Corporation ..	„ 1	44,260	45,234	+ 974	43¾	1,964,159	− 3,362
Glossop (U.E. Sup. Co.)	„ 1	248	217	− 31	13	2,953	− 137
Halifax Corporation ..	Mar. 28	5,582	3,825	− 1,757	50¾	219,641	− 3,201
„ Motor Buses	„ 28	150	68	− 82	50¾	3,913	− 1,917
„ Railless Cars	„ 28	..	35	..	36	1,872	...
Huddersfield Corporatn.	April 1	6,665	4,939	− 1,726	1	4,939	− 1,726
Ilford U.D. Council ..	„ 1	1,482	1,434	− 48	52	77,687	+ 9,814
Ipswich Corporation ...	„ 1	977	707	− 270	52	43,900	− 5,846
Isle of Thanet ..	Mar. 29	1,367	553	− 814	25	15,413	+ 230
Kilmarnock Corporat'n	„ 25	374	304	− 70	44¾	15,914	− 685
Leicester Corporation..	April 1	7,547	7,105	− 442	13	92,673	+ 7,452
Liverpool Corporation	„ 1	30,854	28,679	− 2,175	13	373,842	+ 5,127
London County Ccl. ..	„ 5	103,424	92,244	− 11,180	52¾	5,072,663	+ 157,752
Maidstone Corporation	Mar. 31	525	441	− 84	52	24,118	− 755
Manchester Corp. ..	„ 31	31,335	29,436	− 1,899	52	1,998,403	+ 174,752
Newcastle-on-T. Corp.	„ 25	11,665	8,245	− 3,420	51	534,737	− 32,934
Nottingham Corp.	„ 31	8,479	8,774	+ 295	52	361,139	− 41,227
Oldham Corporation ...	April 5	5,046	4 378	− 668	1	5,895	+ 1,644
Preston Corporation ...	Mar. 31	2,338	2,165	− 173	52	98,562	+ 2,637
„ Motor Buses	„ 31	..	159	..	9¾	1,268	..
Reading Corporation ...	„ 30	1,752	1,445	− 307	52	81,525	− 4,350
„ Motor Buses	„ 30	387	278	− 109	52	17,361	+ 3,481
Rotherham Corporation	April 3	2,640	2,121	− 519	52	117,185	− 22,139
Salford Corporation ..	„ 2	12,046	10,088	− 1,958	...	...	...
Sheffield Corporation..	„ 2	22,111	17,884	− 4,227	52¾	1,003,402	− 80,739
Southampton Corp. ..	Mar. 29	3,474	2,849	− 625	52	153,161	− 10,084
„ Motor Buses	„ 29	179	98	− 81	52	7,581	− 4,747
Southend-on-Sea Corp.	„ 31	296	565	+ 269	52	126,014	+ 7,750
South Shields Corp. ..	„ 18	1,897	1,680	− 217	51	85,307	− 11,741
St. Helens Corporation	„ 28	2,405	1,515	− 890	52	91,333	− 17,356
Sunderland Corp. ..	„ 31	1,845	1,734	− 111	52	134,544	− 22,643
Swindon Corporation..	„ 29	463	323	− 140	51¾	19,948	− 127
Tyneside Trys., Trds...	„ 22	1,170	702	− 468	12	9,096	− 4,272
Wallasey Corp. ..	April 1	2,978	2,333	− 645	52¾	142,761	+ 6,300
„ Motor Buses	„ 1	237	191	− 46	52¾	12,117	+ 3,285
Walsall Corporation .	Mar. 31	1,645	1,252	− 393	52	85,116	− 9,976
„ Motor Buses	„ 31	1,200	629	− 571	52	48,470	− 13,753
Walthamstow U.D.C....	April 1	2.256	1,724	− 532	52	103,703	− 2,109
Warrington Corp. ..	Mar. 30	1,084	1,024	− 60	52	51,945	− 786
West Ham Corp.* ..	„ 30	6,649	5 428	− 1,221	52	304,762	− 730
Wolverhampton Corp.	April 5	1,993	1.657	− 336	1	1,657	− 336
„ Motor Buses	„ 5	546	506	− 40	1	506	− 40

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1920-21.	1921-22.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	April 1	£79,540	85,049	13	£1,082,674	+ 47,482
Ballarat & Ben. (4 wks.)	Jan.	4,594	4.805	44	50,657	+ 3,120
Brazilian Traction (Mlrs)	Feb.	11,941,000	14,473,000	8	29,505,000	+ 4,689,000
Brisbane ..	Jan.	46,280	48,790	4	48,790	+ 2.510
British Columbia $	Feb.	838,682	821,828	34	6,921,985	+ 157,547
Buenos Aires Lacroze ..	Feb.	53,9[illegible]2	55,227	34	460,044	+ 8,695
Burmah Tr. & Lght. Rs.	Feb.	48,405	52,380	8	403,127	+ 45,959
Calcutta .. Rs.	April 1	79,537	109,676	13	1,372,411	+ 564,936
Cape Town	Feb.	..	26,980	..		..
Carthagena & Herrerias	Mar.	2,226	2,145	12	7,993	− 949
Cordoba	Jan.	18,696	22,152	43	230,068	+ 32,934
East India	Mar.	4,168	4,446	34	33,017	− 410
Kalgoorlie ..	Dec.	3,140	2,814	52	27,758	− 9,054
La Plata ..	Feb.	* 728	6,318	52	13,041	+ 5,806
Madras (2 weeks) Rs.	Mar. 31	56,919	47,773	13	291,232	+ 145.588
Manila .. .. $	Feb.	306,389	310,001	8	619,253	− 8,585
Montevideo	Feb.	48,119	48,111	17	180,301	− 11,462
Para	Feb.	20,545	21,582	13	67,208	− 1,821
Pernambuco	April 2	3,929	3.340	13¼	48,917	− 12,308
Port Elizabeth	Feb.	..	6,690	..	..	.
Rangoon .. Rs.	Feb.	120,718	130,583	8	268,433	+ 25,157
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Feb. 18	12,751	15,147	7	108,760	+ 34,067
Winnipeg .. $	Feb.	460,125	498.577	8	1,005,624	+ 39 270

* Strike of employees

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

Common Fund Companies.		
Metropolitan District Rly. Co. ..	Week ending April 1, 1922 ..	£213,069
London Electric Rly. Co.	Corresponding week last year ..	241,706
City & South London Rly. Co. ..	Decrease	28 637
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	2,742,088
London General Omnibus Co., Ltd.	Corresponding period last year ..	2,971,977
	Decrease	229,889

London & Suburban Traction Group		
Metropolitan Elec. Tramways, Ltd.	Week ending April 1, 1922 ..	£46,092
London United Tramways, Ltd.	Corresponding week last year ..	57,377
South Met. Elec. Tr. & Ltg. Co., Ltd.	Decrease	11,285
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	596.548
Gearless Motor Omnibus Co., Ltd.	Corresponding period last year ..	655.248
	Decrease	58,700

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending April 1, 1922 ...	£32 443	3 803	36.246
Total Receipts (13 weeks) ...	426 042	49 803	475 845
MERSEY RAILWAY			
Week ending April 1, 1922 ...	—	—	4.858
Total Receipts (18 weeks) ...	—	—	61.439

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

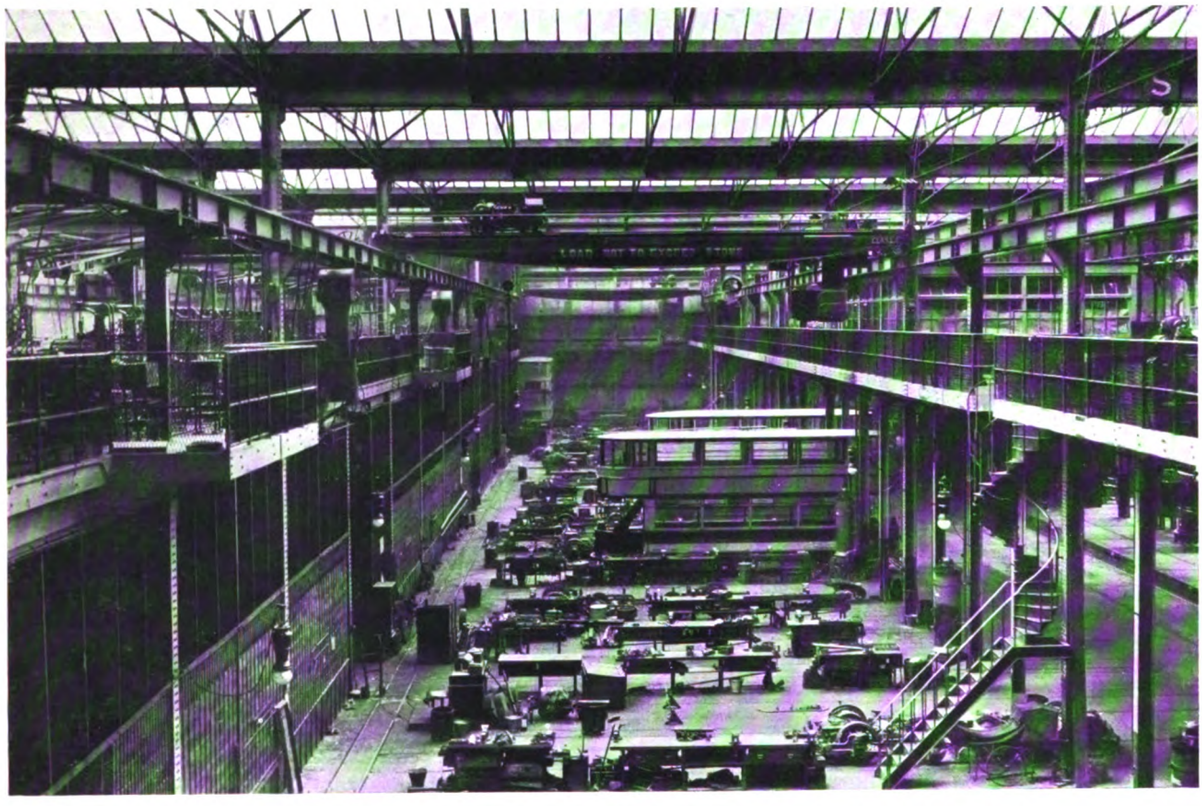
Founded 1892. LONDON, APRIL 13, 1922. VOL. LI.

LONDON COUNTY COUNCIL TRAMWAY IMPROVEMENTS.

EXTENSIONS AT THE CENTRAL REPAIR DEPOT AND GREENWICH POWER STATION.

The policy of centralising the work of repair and renovation of the London County Council's cars dates back to early years of the century. A site of 6·9 acres in extent was then chosen at Charlton, and the first portion of the works was completed in June 1908. The depot has been extended from time to time, and is now in process of completion. Of the whole area, 5·5 acres will be covered by buildings. The main building of the depot will be 650 ft. long and 290 ft. wide. To meet requirements of the police authorities, every car has to be renovated once in each year; this is quite distinct from the minor or running repairs carried out at the running sheds. When the cars are brought in for renovation they are at the same time thoroughly overhauled.

The inspection, paint and body shops are on the right of the inside traverser pit. As the cars enter the depot a general inspection is made, and the amount of work required is determined. Body repairs are carried out and the painting done in their respective shops. On entering the depot, bodies are lifted off the trucks by means of a set of pneumatic jacks, the trucks being run on the traverser to a short track in the truck shop, where they are taken to pieces and every part examined, repaired if necessary, and wearing parts renewed if required. The motors are lifted by electric cranes in their complete state to a gallery situated above the traverser way, where the electric repairs are carried out. Each of the shops is equipped with electric overhead travelling cranes, capable of lifting a complete truck with motors. When the overhaul is completed, every part is re-assembled, and the car tested and returned to its particular car shed to be put in commission again.



The L.C.C. Tramways Central Repair Depot, Charlton—Latest Extension of the Truck Shop.

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At the left of the depot is the portion reserved for machining operations. The wheel shop is equipped with modern high-speed lathes, capable of turning the profiles of two wheels at once. A tyre furnace for shrinking the tyres on the wheel centres, together with special boring mills, completes this shop. The stores are situated below the light machine shop gallery, on the left of the truck shop.

The machine shop deals with all the axle turning, the machining of all the bearings, the manufacture of the brake shoes for the electric track brakes, and all the multitudinous machining work required for the upkeep of the rolling stock of the system. On a small gallery above, light machining and the manufacture of electric fittings is carried out.

On the left of the depot also is the smiths' shop, where the smithing work for the trucks and body ironwork is carried out. All the fumes from the hearth are carried underground by ducts, and are exhausted through large, powerful fans to the outside atmosphere. Adjacent is the temporary foundry, where light cast-iron and brass castings are made. The permanent foundry is now being built.

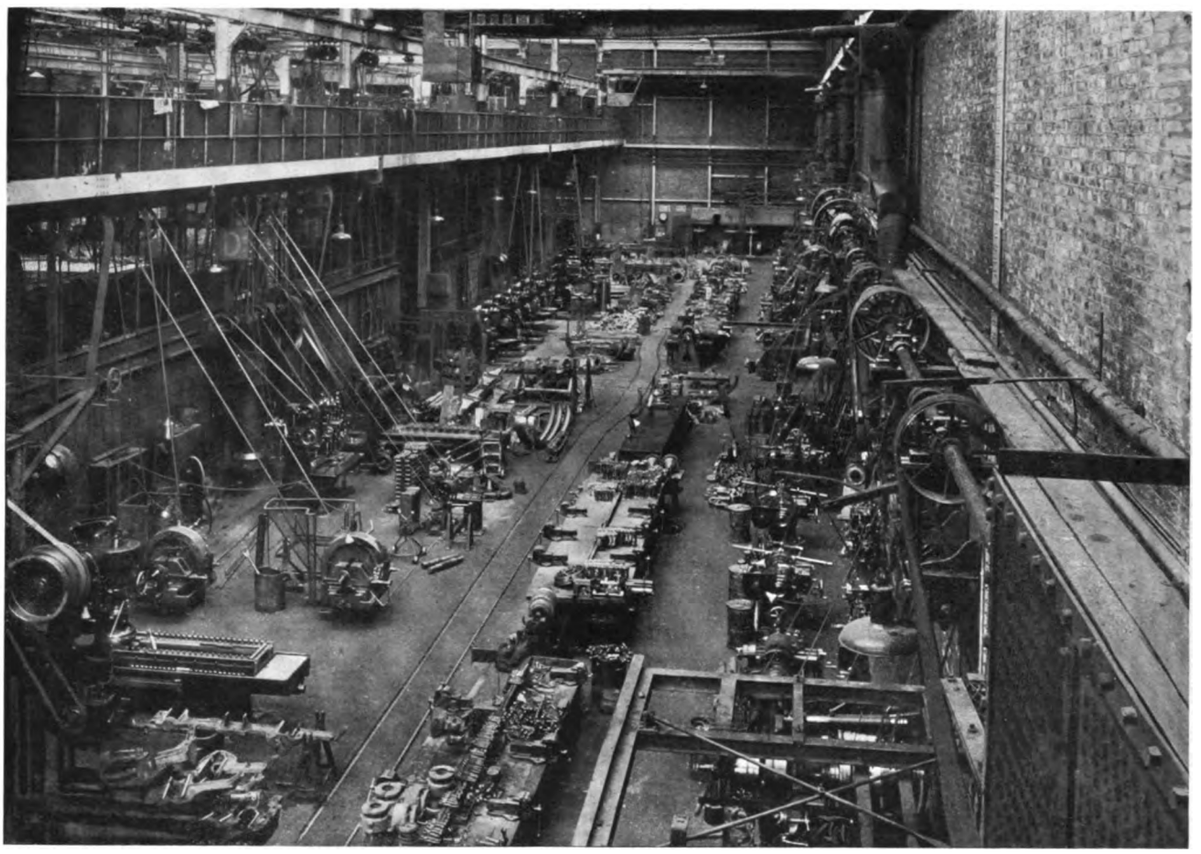
In the north-west corner of the depot is the wood-working shop, with a timber store above. An electric welding plant is installed in the northern portion of the depot, where worn iron and steel parts are built up by the electric arc process. Mess-rooms are provided for the employees.

The large block on the left-hand side of the main gateway was used by the Government during the war for the inspection of war materials; this is at present used as a plough and controller shop, but will be utilised as mess and recreation rooms when the final depot is completed. A large site at the southern end of the depot is to be built upon immediately, and will be used as the central stores for the tramways department.

Power is obtained from the Council's power station at Greenwich, and is transformed in a sub-station adjoining the mess-rooms. The heating is carried out by a high pressure steam system obtained from wet back marine boilers, which are installed above the smiths' shop.

The whole of the trucks used on the tramway system are dealt with at the depot, but owing to there being no physical junction between the northern and southern systems of the tramways capable of taking the top covered cars, only the southern system bodies can be dealt with at this depot at present.

In addition to the cars, motor vehicles are also repaired, as well as the large number of small trucks, etc., used in the undertaking.



The Machine Shop, with Works Track in the Centre.

When the equipment is completed there will be about five hundred machines of various descriptions installed in the complete depot, and approximately 500 yards of shafting driven by motors of a total horse-power of six hundred.

The Power Station.

The fourth of the reciprocating engine sets at Greenwich power station is now being dismantled, and it will be replaced by a further large turbo-generator set. Three of the reciprocating engines have already been replaced by turbine sets. Originally there were four turbines of 6,000 kw. each, and four reciprocating engines of 3,500 kw. each, and it is the last of the latter which is now being replaced. The river end of the station will then have four turbo-generators of a maximum capacity of 10,000 kw. each, while the south end has the original four of 6,000 kw. each.

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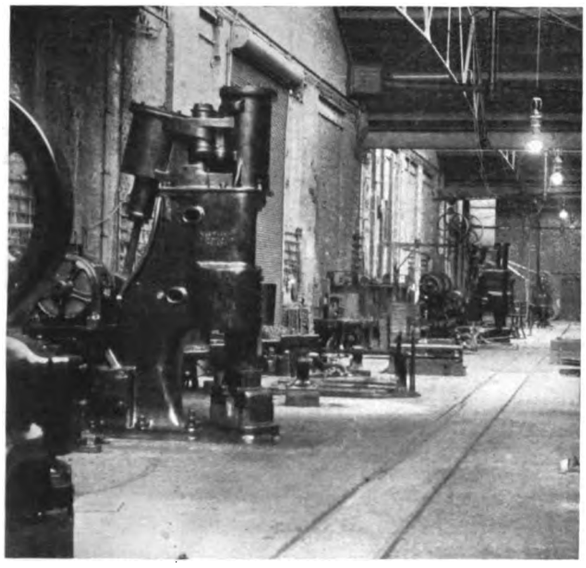
Energy is generated at a pressure of 6,600 volts, and is dealt with by electrically-operated remote control switchgear. The main and section bus-bars are in cubicles, and are operated by push button switches from the control deck. The high tension cables go to sub-stations in various parts of London, and in these the energy is transformed to 550 volt direct current.

The boiler-house has 48 boilers. Some of these at the river end of the station, which was the part first erected, are of small size, and they are about to be replaced by large modern units. Four of the large boilers at the south end are fitted for burning oil fuel; all the others have chain grate coal stokers. Above the boilers are situated the economisers and the coal storage bunkers, which have a capacity of 12,000 tons. The requirements of the station are about 3,500 tons of coal per week. The pier can accommodate coal steamers up to 2,000 tons. All coal is unloaded by electric cranes and grabs.

The entire station occupies a site of about three and three-quarter acres. It has four large chimneys, two 250 ft. high and two 280 ft. high. The difference in height is explained by the fact that it was found that if the shorter chimneys were carried higher it would interfere with certain work at the Greenwich Observatory.



The Smiths' Shop, showing Pneumatic Power Hammers.

INCREASING HEADROOM FOR L.C.C. CARS.

A Difficult Piece of Track Reconstruction.

To enable the cars equipped for both the overhead trolley and the conduit system to pass under railway bridges on the Clapham and Balham high roads, the double tracks of the London County Council Tramways have had to be lowered. It was determined to do this without interfering in any way with the tramway traffic—a very difficult operation which was carried out without injury either to the men, to the rolling stock, or to the permanent way. The awkwardness of the problem will be realised by the fact that 68 cars were running per hour for about five hours of each day and 40 cars per hour for the remainder of the day. During the night four hours were available with only a half-hourly interruption by the night car services, and on Sundays there was no traffic between 1 a.m. and 7 a.m. At the Clapham Road bridge under the S.E. and C. Railway the line had to be lowered eight inches. This involved altering the tracks for 200 yards, including the level portion under the bridge and the two approach gradients. The conduit extended to a depth of 2 ft. 9 in., and as it is formed of concrete, in which cast-iron yokes at intervals of 3 ft. 9 in. are embedded in order to form and strengthen the structure and support the slot rails, the whole is of a very rigid type. The operations had to be carried out during the past winter in order that the lowered roadway might be available for new car services in the early spring.

The work was very slow owing to interruptions by passing cars, which meant that the workmen and their tools were moved from the trenches on 40 to 60 occasions per hour. One track was lowered before the other was interfered with. In the first place the paving was removed during the daytime, and the concrete below it and under the running rails was broken up. Then the concrete of the conduits was broken up during the night. When the concrete was removed from under the running rails, timber packings resting on previously prepared concrete blocks were placed under them. Similar packings were also placed under the cast-iron yokes. The soil under the tramway was then excavated for an average depth of about 15 in., and the packings carrying the rails and yokes adjusted one by one to the deeper level, which now formed an excavation 4 ft. deep below the surface of the road. The sub-soil was of a clayey nature, and when the excavation was so far executed there were several wet days which made it necessary to increase the vigilance required for maintaining the packings in position, and the placing of additional packings as the others sunk into the wet subsoil. At night new yokes with extended arms were laid, and on subsequent nights new rails were attached to these yokes, lined up, and gauged in readiness for the resumption of the tramway traffic in the morning. On the first succeeding Sunday morning, packing pieces were evenly withdrawn from all packing points practically simultaneously, and the process repeated until the rails and yokes had dropped down to the required new level. This lowering process occupied about 1½ hours, the track was then secured, gauged, and lined up in readiness for the car services. During succeeding days forms were fixed between the yokes to act as centres for the conduit concrete, the yokes were surrounded with concrete, and the whole of the excavation was afterwards filled in with similar material.

The remaining operations of paving were completed during the daytime, and final adjustment to the conductor rails in the conduits finished at night time. A bank of eight cable ducts had to be lowered in the 3 ft. 6 in. between the tracks. The second track was lowered in a similar manner to the first. The lowering of gas mains and alteration of sewer entrances adjacent to the second track was done after the lowering, as they did not cross the rails. The excavation of the concrete and soil in the tramway area was greatly hampered by the necessity for keeping the conductor rails electrically alive, but the continuity of the operations was made possible by confining the work to the negative side of the conductors. When the work had to be done on the normal positive side, the polarity of the current was reversed. When the tramway

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carriageway breasts were lowered, the area under the bridge lay in a hollow, and specially frequent rail drains connected the grooves of the rails with the conduit; several open grid catch pits were suitably placed in the paving in order to carry away surface water as quickly as possible. The average daily number of men employed was about 40, during 73 days, between November 14, 1921, and March 3, 1922.

At the Balham Bridge, under the L.B. and S.C. Railway, the operations were similar to those at Clapham Road. The lowering here extended over 70 yards, and amounted to six inches in the centre portion. In addition, there were three 30 in. water mains under the track, and its lowering would have brought the construction to bear nearly on these pipes. To avoid this, concrete piers were sunk at 15 ft. intervals longitudinally, and on these the tracks rested in order to relieve the pipes from further road pressure. The average number of men employed was 33, during 51 working days.

Mr. A. L. C. Fell, general manager of the London County Council Tramways, directed the work, which was carried out under Mr. J. Welling, permanent way engineer, by direct labour. The success of the operations was due to the skilful preparation of the programme, and to the cordial co-operation of all engaged in the direction and execution of the lowering work.

SHANGHAI RAILLESS TROLLEY CARS.

The latest type of railless trolley cars of the Shanghai Electric Construction Company, Limited, is shown in the accompanying views. It will be seen that the forward portion of the vehicle is reserved for first-class and the rear section for third-class passengers, the two portions being divided by a partition. These cars were built by the company in their extensive and well-equipped works at Shanghai. The railless trolley

A Shanghai Two-Compartment Railless Trolley Car.

system, in fact, is largely used by the company in combination with their electric tramways, and they are making constant efforts still further to develop the railless system.

In the course of a lecture delivered by Mr. Donald McColl, the general manager of the company, on "Transport in Cities, with Special Reference to Shanghai," under the auspices of the Shanghai Civic League, he pointed out that his company had had a preliminary railless electric route in operation for nearly six years. "This period," he added, "is a year more than the life of the motor omnibuses, as stated by the London General Omnibus Company. Our experience shows that the efficient life of railless electric cars will be incomparably longer than that of motor omnibuses." In discussing the peculiar advantages of the railless system, Mr. McColl said that for roads which are too narrow for double track tramways and with traffic requiring more frequent services than could be run on a single track tramway, the railless

Shanghai Railless Car, showing Centre Door.

system is the most suitable. Turning to the double-deck railless vehicle, he referred in his lecture to the first of this class to be used—that designed by Mr. R. H. Wilkinson (general manager of the Bradford Corporation Tramways). On the whole, Mr. McColl concludes that the single deck railless car is more suited to conditions in Shanghai than is the double-deck type.

It appears that the Shanghai Electric Construction Company have made repeated proposals to the municipality for authority to extend the railless routes, and that although some 16 miles of additional route were approved, the terms then imposed by the Council were too onerous to be practical.

Mr. McColl said that in 1921 they carried seven million passengers per mile of route per annum. The system extended by the additional 16 miles proposed should deal with about 200 million passengers per annum. With double track throughout, a further 50 millions might be carried. At a moderate computation electric traction facilities for 400 million passengers per annum will be required in the Foreign Settlement within the next few years. This would call for from 60 to 70 miles of route. For the combined administrative areas of Shanghai probably 140 miles of route would be required to transport 700 to 800 millions of passengers per annum.

Omnibus Powers for Glasgow Corporation.—The Parliamentary Commission which has been sitting in Glasgow to consider a number of Provisional Orders promoted by local authorities, devoted considerable time to that of Glasgow Corporation. This includes clauses providing for the establishment of omnibus services in the city and within a ten-mile radius beyond the tramway termini. There was no opposition to the proposals regarding powers within the city, but in respect of those beyond the boundary, objections were made by various interests, including private motor service proprietors and railway companies. The Commissioners found the preamble proved as regarded general powers, and in respect of two only of several specified routes beyond the city. They also decided in favour of inserting the "model clause" under which the Corporation will be prohibited from manufacturing omnibuses.

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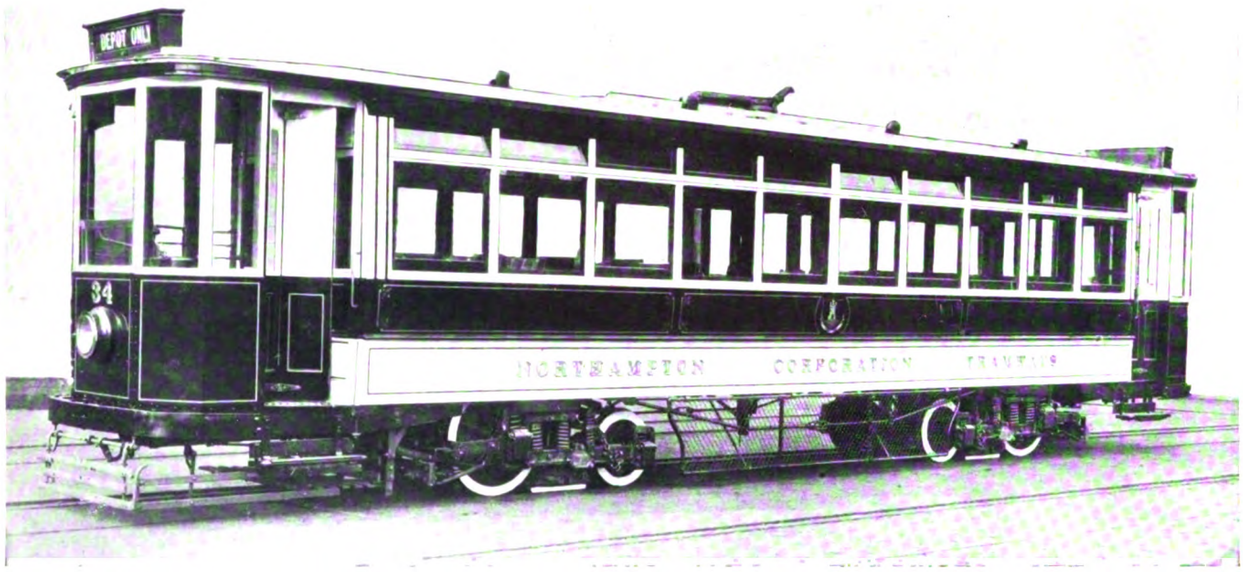
NORTHAMPTON CORPORATION TRAMWAYS.

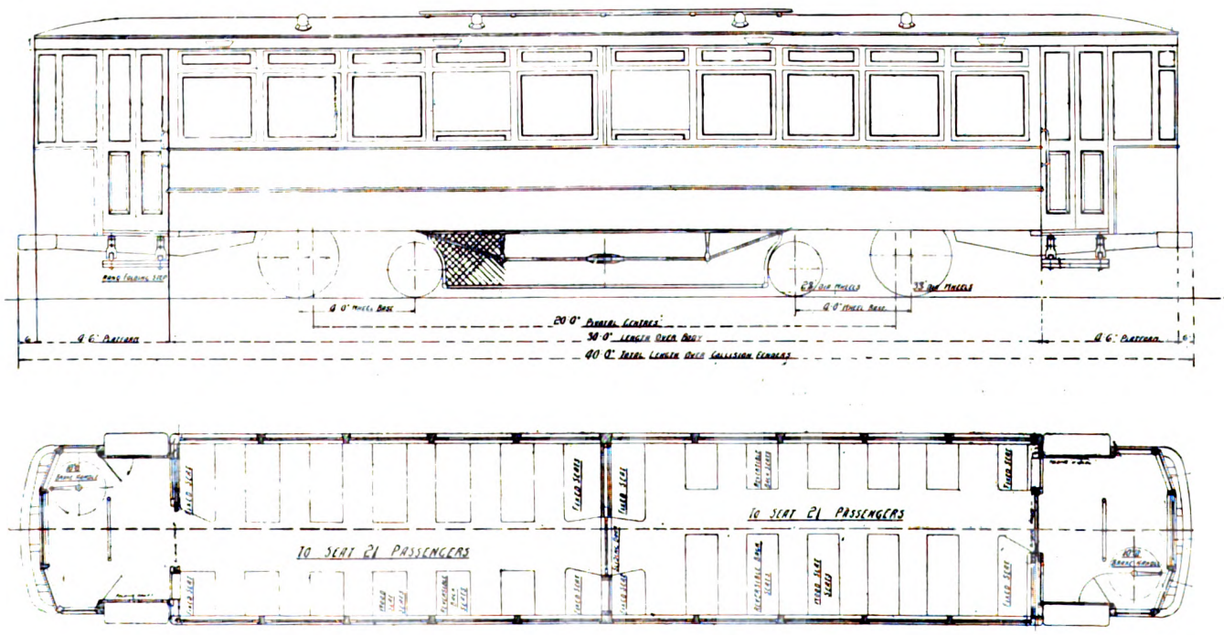
A NEW SINGLE-DECK CAR.

The new type single-deck car, which is shown in the accompanying illustration, was put into use a short time ago by the Northampton Corporation Tramways. These cars were constructed throughout at the Dick, Kerr works of the English Electric Company, Limited, at Preston, and are equipped on thoroughly up-to-date lines. The seating capacity is 42. The seats are arranged transversely, and they are of the wood slat type. With the exception of the corner seats, they have reversible backs. Smoking and non-smoking compartments, separated by a sliding door, are provided. The motorman is fully protected, having a compartment entirely to himself. The passengers' exit door is at the near side of the forward end of the car, and is of the folding type. The step to this door is also made to fold, and is operated by the driver through a lever situated near the controller. The car is fitted with pony wheel trucks, with magnetic track brakes between the pony and driving wheels. Back sanding gear is installed, so that in case of a brake failure when climbing a hill, the motorman can drop sand in front of the wheels.



New Single-Deck Car of Northampton Corporation Tramways.

The car is well lighted and amply ventilated. Ten drop lights are fitted along each side of the body, and over each is a hinged ventilator. The front light of the motorman's compartment is also made to fall. Air extractors, similar to those on railway carriages, are fixed in the roof. The life guards are of the



Elevation and Plan of New Single-Deck Car—Northampton Corporation Tramways.

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Hudson and Bowring type, the side guards of the Philipson pattern, while the space between the pony wheels is protected by a wire guard. The dimensions of the car, which is 13 feet longer than the Corporation's earlier type, are as follows—

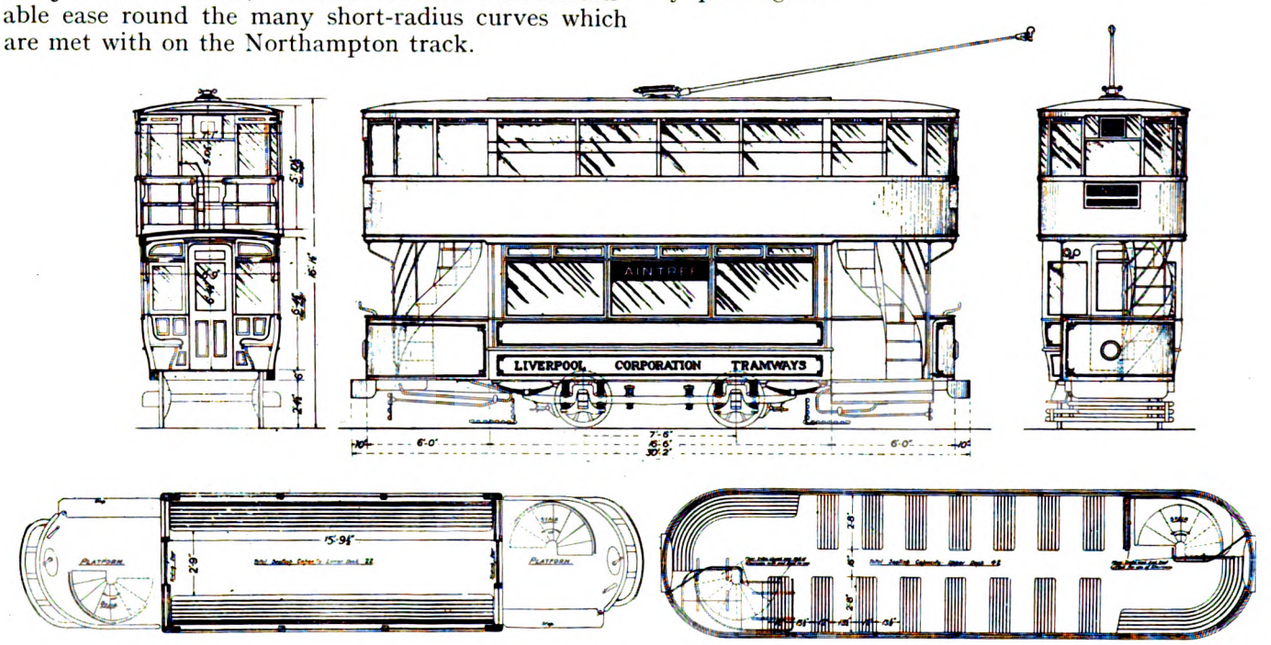
Overall length (over collision fenders)	40 ft.	Clear height, inside	6 ft. 9 in.
Length over body	30 ft.	Width	6 ft. 3 in.
Platforms	4 ft. 6 in.	Diameter of driving wheels	2 ft. 9 in.
Pivotal centres ...	20 ft.	Diameter of pony wheels	1 ft. 11 in.
Wheel bases ...	4 ft.	Gauge	3 ft. 6 in.
Total height ...	10 ft.		

On the whole, the car presents a pleasing appearance, and the engineer and general manager of the tramways, Mr. John F. Cameron, states that it rides with remarkable ease round the many short-radius curves which are met with on the Northampton track.

LIVERPOOL CORPORATION TRAMWAYS.

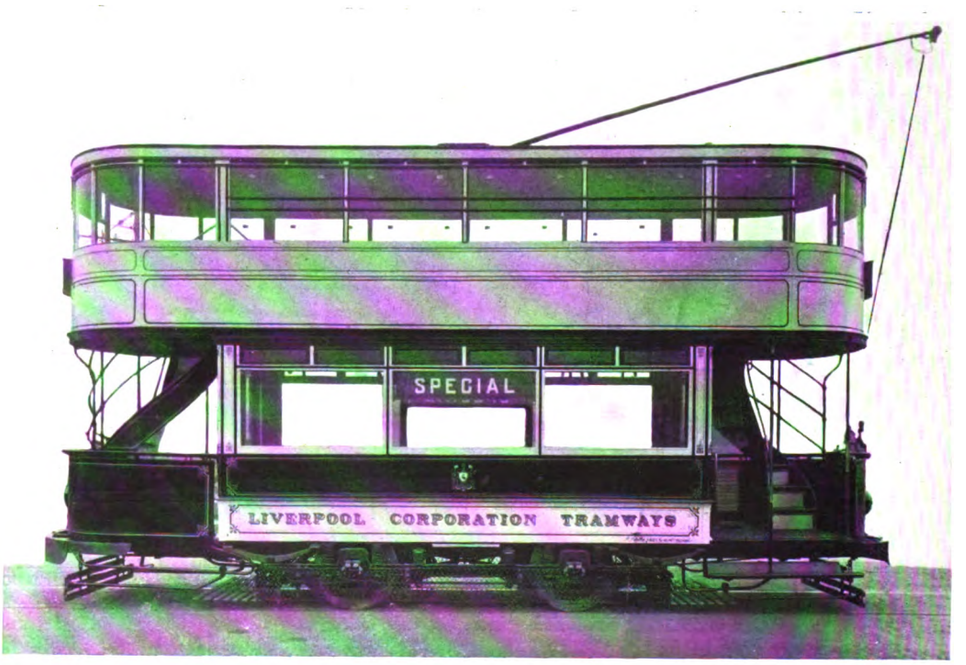
An Improvement in Car Design.

The accompanying illustrations are of a new type of top-deck vestibule car constructed by Liverpool Corporation Tramways department to the designs of Mr. P. Priestly, the general manager. This car is almost identical with the type illustrated and described in our issue of August 18, 1921. The principal difference is that on the later car the end vestibules of the upper deck are completely enclosed with glass screens—an improvement which will doubtless be appreciated by passengers.



Elevation and Plan of New Car of Liverpool Corporation Tramways.

End View.
Showing enclosed upper vestibule.



New Car of Liverpool Corporation Tramways.

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MELBOURNE AND METROPOLITAN TRAMWAYS BOARD.

The report of the Melbourne and Metropolitan Tramways Board for the year ended June 30, 1921, mentions that under an amending Act the Board is now enabled, pending the adoption of a general scheme, to deal with the question of tramways urgently required. Under the principal Act the Board could not make proposals for new tramways until it had prepared a scheme for tramway development as a whole. The total debenture liabilities of the undertaking now amount to £1,334,088. To provide funds for the Footscray and the Preston electric tramways, additional rolling stock, plant, etc., a loan of £100,000 at par for a period of five years at 6½ per cent. has been arranged with the State Savings Bank of Victoria.

During the year the traffic returns were adversely affected by several industrial disturbances. By order of the Coal Board, and arising out of the strike of stewards and seamen, all tramway traffic was suspended after 7 p.m. on weekdays, and entirely discontinued on Sundays between January 5 and February 28, 1921. The traffic receipts totalled £1,615,107 (an increase of £143,167), and it is estimated that the net loss to the Board through the strike was approximately £40,000.

To meet the increased cost of operation and standing charges an increase in fares was made on March 7, 1921, and overlapping sections were abolished. The average distance which may be travelled for a penny on the cable tramways is 1·44 miles, and on the electric lines 1·17 miles. Tokens are sold to passengers on the electric tramways at the rate of four for 6d. These tokens are very light, four or five being the same weight as a halfpenny coin. As about 45 per cent. of the electric tramway passengers pay single section fares, say 1½d., it is believed that the use of the tokens will be readily adopted by passengers.

The net revenue from the cable system was £303,314, and from the electric lines £98,794, a total of £402,108. After providing for interest, redemption of loans and sinking fund, sick pay allowances, contributions to employees' benefit society, and to War Loan applications, there was a balance of £270,693. The cost of electrical energy during the year averaged 1·152d. per kelvin, and the average consumption for traction and car lighting per car-mile was 2·32d. The operating costs were largely increased during the year by several awards of the Court of Conciliation and Arbitration, which raised wages.

The number of cars in service on the various systems was as follows—Cable tramways—573 dummy cars, 529 standard cars, and 58 bogie cars; Eastern and Northern electric systems—125 single truck cars, and 48 bogie cars.

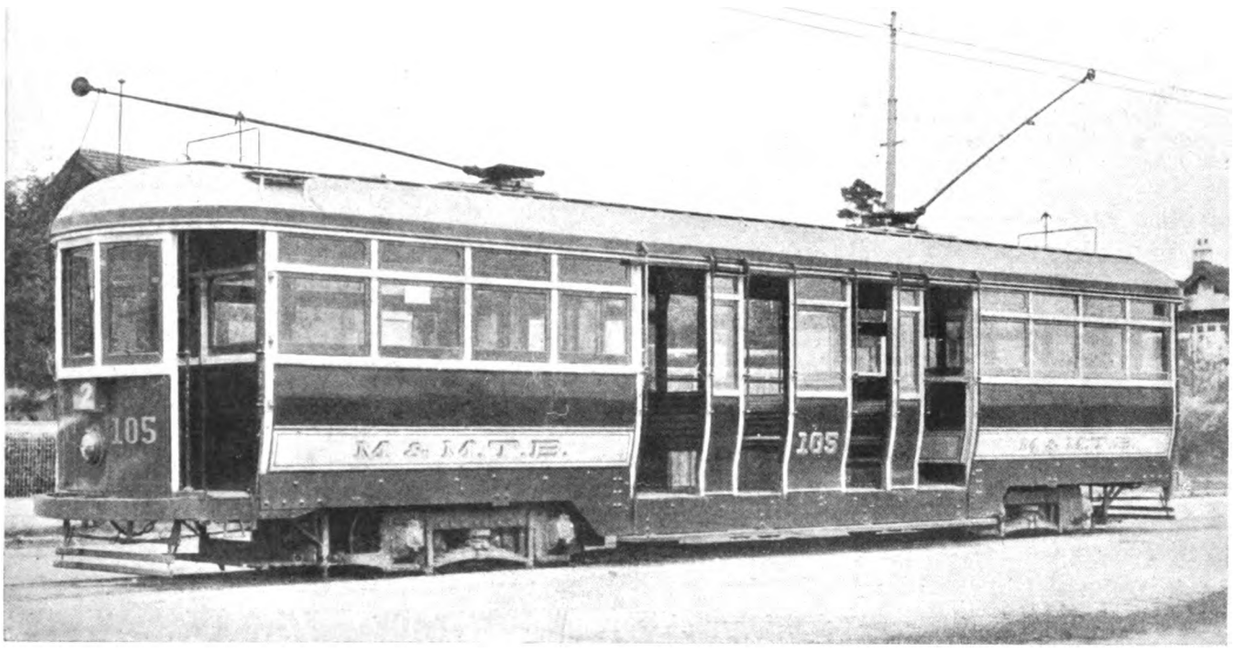
A special staff was engaged during the year in collecting and recording statistical information necessary for the formulation of a general scheme of tramway development which the Board has under consideration.

The officers of the Board are as follows—Messrs. Alex. Cameron (chairman), Alderman W. W. Cabena, Colin Templeton, T. O'L. Reynolds, Hon. J. G. Membrey, E. H. Willis, Councillor H. H. Bell, W. O. Strangward (secretary), H. S. Dix (chief manager and acting chief engineer), J. G. Roberts (manager, cable system), S. Robertson (manager, eastern electric system), M. K. Westcott (manager, northern electric system), C. Andrews (treasurer and accountant).

The following statistical information is appended to the report—

Population served by tramways	632,000
Journeys per head of population per annum ...	332

	Cable.	Electric.
Gross capital expenditure	£2,124,629	£1,697,147
Mileage of double track	45·9	45
Mileage of single track	—	19·4
Traffic receipts	£1,145,335	£469,772
Total revenue	£1,147,747	£473,013
Working expenses	£844,433	£374,219
Balance of revenue over operating expenses	£303,314	£98,794
Tram miles	14,068,981	5,808,785
Passengers carried	149,048,681	60,898,641
Average maximum number of cars in use daily	456	136
Percentage of working expenses to total revenue	73·6	79·1
Average traffic receipts per car-mile ...	19·538d.	19·409d.
Average traffic receipts per mile of single track	£12,309	£4,298
Average traffic receipts per passenger...	1·84d.	1·85d
Average total receipts per car-mile ...	19·58d.	19·54d.
Average speed per hour, including stops	9 miles	10 miles
Average working expenses per tram mile—		
Excluding power cost	11·128d.	12·790d.
Including power cost	14·405d.	15·462d.
Scale of fares	1d. to 3½d.	1d. to 7d.
Average distance per penny fare ...	1·44 miles	1·17 miles
Average passengers per tram mile ...	10·59	10·48
Number of cars in stock	587	173
Number of dummies in stock	573	—
Average number of kelvins used per tram-mile	—	2·32
Average cost of current per kelvin ...	—	1·15d.
Number of employees	2,836	1,275



New Bogie Car, with Central Entrance, of Melbourne and Metropolitan Tramways Board

Increasing Popularity of the One-Man Car in the U.S.A.—One of the most recent pronouncements in favour of the one-man car is that of the United Electric Railways of Providence, Rhode Island, who propose to use one-man safety cars on one city and seven suburban routes. New cars will be purchased and some old cars converted to the one-man operation.

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THE EDITOR will be glad to consider articles by experts. All information of a practical character relating particularly to the engineering and operating branches of transportation will receive prompt attention. Original illustrations will also be welcome.

LONDON, APRIL 13, 1922.

Electric Railway Development.

Events continue to shape themselves in such a way that an early beginning of large electric railway development in London and the south-east of England may be expected. In the latter part of March the official announcement was made that the Treasury had agreed to guarantee a loan of £5,000,000 to be raised by the London Electric and the City and South London Railway Companies for the purpose of carrying out their long-contemplated extensions and improvements. Provision for making such State guarantees is set out in the Trade Facilities Act of 1921, which was passed for the purpose of promoting useful works the construction of which would relieve the prevalent unemployment. It is certain that the widening of the tunnels of the City and South London Railway, the building of a new extension line from Hampstead to Edgware, and the construction of certain connecting links will give employment for many men; the number has been estimated at from 15,000 to 20,000. When the works are completed the London travelling public will find their facilities much improved. The railway companies on their part will have a considerably lower rate of interest to pay on the new capital than if it had been raised by loan in the ordinary way, while they may hope for a considerable increase of revenue. The scheme for the further electrification of the suburban lines of the London and Brighton Railway and for a beginning of the conversion of the suburban lines of the South Eastern and Chatham Railway has also been advanced by an agreement arrived at between these two companies and the London and South Western Railway regarding methods of electric traction. The South Eastern Company estimate an expenditure of nearly six millions sterling on the electrification, the first stage of which will cover 210 miles of suburban tracks. Some ten millions in all will be required to electrify about 300 track miles of suburban lines of the Brighton system. How long it will be before these great projects are fully put in hand and completed remains to be seen.

Realisation of a Long Deferred Project.

The announcement made recently that the London County Council cars will commence running early in May between the Thames bridges and Wimbledon by way of the London United Tramways lines at Tooting and Merton recalls to mind that the initiative in this much needed improvement in tramway service in south-west London was first taken fifteen years ago by the late Sir Clifton Robinson, the then managing director of the London United Tramways. Shortly after the opening of the London United Tramways lines in Wimbledon and Tooting in 1907, Sir Clifton sought Parliamentary powers for the construction of the few yards of line required to connect the dead ends of the two systems at Tooting, and for the right to work the London United Tramways cars through to Westminster Bridge. In return for this concession the London County Council cars were to run through from the bridges to Wimbledon, Kingston, and Hampton Court. Strange to say this commonsense scheme was strongly opposed by the London County Council and by that section of the London press which is most clamorous nowadays for the extension and linking up of the tramway services of the Metropolis. The opponents of the scheme put forward the allegation that in return for allowing the London United Tramways cars to run through the thickly

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populated districts of the county area the Council's cars would traverse thinly populated and semi-rural regions. A service of London County Council cars to Hampton Court from Westminster Bridge was scoffed at, and the opposition waxed scornful at the very suggestion of the cars of a private company being allowed to run over municipal lines. Those familiar with the recent history of tramway operations in the Metropolis will readily agree that Sir Clifton Robinson's proposals for interchange traffic between the London County Council and London United Tramways systems would have proved advantageous to both the undertakings concerned, as well as to the travelling public. In the present condition of London traffic, any measure of prosperity that awaits tramway operations can be obtained only through the closest co-operation among the various systems working in the London area, and the linking up of dead ends wherever practicable. The arrangement under which the Council's cars will work through to Wimbledon is not exactly analogous with the proposals that were put forward by Sir Clifton Robinson, but are rather in the nature of a compromise arising from the Council's taking over of the London United Tramways lines in the county area at Hammersmith. In return for being allowed to work through to Hammersmith and Shepherd's Bush over the lines acquired by the Council, the London United Tramways Company will relinquish to the London County Council the entire operation of the London United Tramways lines in Wimbledon and Tooting. When the dead end of the old London United Tramways line at Hammersmith is linked up with the London County Council Harrow-Road Wandsworth line, the Council will run services of cars through to Kew Bridge, and a journey by tram from Kew to Putney and Wandsworth without change will then be practicable.

Industrial Disputes. In times of depression as in those of prosperity industrial troubles are always with us. It is not altogether a disadvantage that there should be differences of opinion; but the practical working out of these differences as we see it to-day is thoroughly bad. The evil effects of the succession of strikes and lock-outs are patent to everyone. The time wasted causes loss of material wealth to the community, most of all to those directly concerned; the atmosphere of doubt and uncertainty continually maintained handicaps our merchants abroad in their uphill fight against countries having every advantage of exchange; finally the atmosphere of strife and class hatred deliberately fostered by a small section is aggravated by industrial contests the rights and wrongs of which it is frequently impossible to ascertain with any precision. The actual development of each struggle is a matter of crowd psychology. Insistent carpings at those in authority, misrepresentations of mistakes committed, a seemingly unselfish appeal to stand up for class rather than personal interests, or the pursuit of some obscure social ideal, are all invoked to bring about a state of exasperation which any trivial incident will transform into active hostilities. The pity of it is that these hostilities, when they come, cannot in one slightest respect improve the situation of either party. In the end they will have to accept a settlement which, as far as material conditions go, was just as possible at the beginning, with the meagre consolation which all beaten parties seem able to gather that they have somehow or other maintained some "honour" intact. It is a sad reflection that all the disturbance is really so futile, but it can be repeatedly seen in the course of any dispute. As soon as the enthusiasm has worn off, the original pretext of the dispute either falls into oblivion or is wrapped up in an impenetrable mist of explanations, and the last half of the dispute drags out in an undignified search for a face-saving formula. How, then, can we explain the recurrence of these ugly manifestations at once so harmful and so unavailing for any purposes of good? It is the social system, we are told. But can anyone conceive of any system doing better where good will is lacking? Do the methods of another system, now exemplified in Russia, seem likely to be kinder or more conducive to the public weal? Such a position can never be maintained by argument; it is unthinking temperamental anarchism with which we have to contend. This small section, divided as it is between a thousand policies for constructive purposes, is none the less at one and in deadly earnest in the sole determination

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to subvert the existing state of things. Filled with anger by some mystic revelation of the shortcomings of capitalism, their mission is to overthrow it, lock, stock and barrel. They are nothing if not thorough; their object can be most promptly achieved after the pattern of their continental masters by destructive revolution. As the citizens of this country are not disposed to be stampeded into anything of that kind, less "ideal" methods must be employed; the present system must be made unworkable from within. In pursuit of this plan every industry is tackled as opportunity arises; seeds of disunion are scattered broadcast; wherever they find suitable ground manure is at once provided, and a crop of troubles raised. The greater the disorganisation resulting, the more successful is the attempt considered. The actual settlement is of little account, provided it has been postponed as long as possible. In fact, the more bitter the feeling left the better; it will be easier to begin again. In the meantime much dirt has been thrown into the cogs; one day the wheels will cease to go round. This, in short, is the danger which organised labour has now to face. It has done great service to the community in the past by improving the position of the labourer and rooting out abuses; if it is to maintain its usefulness it has now to combat this insidious movement against its own welfare and the liberty of the citizen that has already secured a fighting foothold in its own ranks.

MELBOURNE TRAMWAYS ELECTRIFICATION.

Conversion of Cable Lines.

Plans are being prepared by the Melbourne (Australia) Metropolitan Tramways Board for the electrification of the cable lines which constitute more than half their total track mileage. The Board controls all the tramways within the Metropolitan area, serving a population of over 600,000. Their engineers have, *The Times* reports, been engaged for some time upon a complete scheme, which, it is recognised, must be decided upon before any individual conversions are undertaken. The conversion of the cable lines cannot be undertaken as a single job.

The electric tramways will be gradually brought into the city, one line at a time, until the conversion of the obsolete cable system is complete. A great deal of work is involved in such a scheme. It is the business of the engineers not only to provide for present tramway needs, but also to take into consideration such factors as the growth and development of districts and the possible needs of 20 years hence.

The first part of the conversion scheme will be the extension of the present electric termini to the city. When the plans are complete they will be submitted to the Parliamentary Railways Standing Committee, the function of which is to investigate all railway and tramway construction propositions. It is the practice of the Government and Parliament to adopt the Committee's recommendations.

TRAMWAY AGREEMENT OF MARCH, 1922.

In the Journal of the Municipal Tramways Association for April Mr. J. Beckett, the general secretary, makes the following comment on the agreement made between the tramway employers and employees on March 9, 1922, given in our issue of March 16 last:—

"On March 9, 1922, almost three years after the first National Agreement was made, the National Council adopted with unanimity the terms of a new agreement, after seven days' negotiation, during which time every aspect of the conditions of service for tramwaymen was thoroughly examined and sifted. The members may take it that the new terms represent the best compromise that could be made with the goodwill and consent of both parties, and all parties are now invited by their representatives upon the National Council to adopt them. So far as the men are concerned, their representatives on the National Council—eighteen out of twenty-two who were present—voted in favour of the terms, and they will recommend their adoption. We may reasonably count upon acceptance by them.

"So far as municipal tramways are concerned, it is not proposed to convene another special general meeting of the Association. Their representatives have done their utmost to give effect to the decision of the last special general meeting, which was held on December 9 last. Those representatives now appeal to all the constituents of the Association to put the terms into force as and from the commencement of the first full pay period after April 17, 1922, and they rely upon their loyalty and co-operation. During these prolonged negotiations Mr. Fearnley has occupied the onerous position of spokesman for the representatives of municipal tramways, and, by common consent, has discharged his duties with conspicuous ability and success. It is not putting it too high to say that the whole industry is indebted to him for the sacrifice he has made during recent weeks in the common interest."

RATIFICATION OF THE AGREEMENT.

At a meeting of the National Joint Council the resignation of Mr. W. J. Squires was accepted with regret, and the best thanks of the Council were accorded to him for his splendid services as chairman of the Council since it was formed. Mr. J. M. McElroy's resignation was also accepted with regret, and the Council placed on record their appreciation of his services and untiring devotion to its interests. M. A. L. C. Fell and Mr. John Barnard were elected members of the Council.

Reports of the constituent associations respecting the revised agreement were received. Mr. Fearnley reported that there was no dissentient among the municipal tramway authorities, and Mr. Tegetmeier reported that the conference of tramway and light railway companies had recommended to the companies concerned the adoption of the agreement. Mr. Cliff reported that the employees had by a majority decided to accept the agreement.

A question was raised as to the meaning of the words, "this date," referred to in Clause 2 (*a*) of the revised agreement, and it was resolved that the words "this date," be construed as the date of the signing of the agreement, viz., April 11, 1922.

The committee recommended that the terms and conditions of service of the permanent way employees who had been working under the March 1919, agreement, should be the subject of local negotiation and agreement between the undertakings concerned and the trade union representatives.

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FUTURE OF LIGHT RAILWAYS.

REPORT OF INVESTIGATION COMMITTEE.

We give below a summary of the valuable report on the present condition and future prospects of light railways in the United Kingdom which the Light Railways (Investigation) Committee prepared for the Minister of Transport. It is dated 1921, and occupies nearly 26 pages. The report, together with the separate appendices, has been issued by H.M. Stationery Office.

The constitution of the committee was as follows—

Sir ALEXANDER GIBB, G.B.E., C.B., Director-General of Civil Engineering, Ministry of Transport, chairman.
Sir WILLIAM M. ACWORTH.
Sir JOHN A. F. ASPINALL, M.Inst.C.E., M.I.Mech.E., Consulting Mechanical Engineer, Ministry of Transport.
Mr. V. M. BARRINGTON-WARD, D.S.O., M.Inst.T., Traffic Department, Ministry of Transport.
Mr. T. CARTWRIGHT, Bishop's Castle Railway, Shropshire (unable to attend meetings, and therefore not a signatory).
Mr. C. E. DREWETT, Lynton and Barnstaple Railway Company.
Lieut.-Colonel J. A. S. GRAY, C.M.G., D.S.O., Development and Engineering Department, Ministry of Transport.
Mr. W. T. D. GRUNDY, Derwent Valley Railway, York.
Mr. A. H. LORING, East Kent Railway.
Mr. E. W. OAKLEY, Saundersfoot Railway and Harbour Company, Glamorgan.
Colonel J. W. PRINGLE, C.B., R.E., Chief Inspecting Officer of Railways, Ministry of Transport.
Lieut.-Colonel H. F. STEPHENS, chairman of Associated Railways, Tonbridge, Kent.
Mr J. R. DEANS, Ministry of Transport, secretary.

The terms of reference of the committee were—"To examine and report upon the future policy and development of Light Railways operation and construction in the United Kingdom, due regard being given to the possibility of utilising roads for mechanical transport as an alternative, and as a preliminary to submit full information as to continental methods," with particular reference to certain points mentioned in a subjoined list. At the outset of the report the signatories recall that they were appointed in March 1920, and they proceed immediately to summarise the conclusions and recommendations at which they have arrived.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.

1. We are in complete agreement with the proposal to transfer the powers of the Light Railway Commissioners to the Minister of Transport.

2. When an application for a Light Railway Order is rejected on grounds other than non-compliance with the rules of procedure, promoters should have a right of appeal to Parliament on payment of an additional fee, but the notices published and served and the deposits made for the purpose of the application should be held to suffice for the purpose of the appeal.

3. (a) Requests for State assistance under Section 17 of the Ministry of Transport Act, 1919, should be considered on their merits, and without reference to the conditions on which Treasury advances have been made under the Light Railways Act, 1896.

(b) The Minister of Transport should have power to subscribe to the share capital of, as well as to make a grant or loan to, a light railway company.

4. No ampler provision than that contained in Section 11 (f) of the Act of 1896 is necessary for the representation of a local authority on the managing body of a light railway company to which it has made an advance.

5. We welcome the amendment which has been inserted in the Railways Bill, under which (a) local authorities would be empowered to guarantee interest on the capital of light railway companies, and (b) Section 11 (f) of the Act of 1896 would be made to apply to cases in which such guarantees were given.

6. The Minister of Transport should have some voice with regard to the design of any light railway which receives assistance in future from public funds; and where this assistance is rendered in the shape of subscriptions to share capital, the State or the local authority so subscribing should possess the ordinary rights of shareholders.

7. Where it is proposed to acquire land compulsorily for light railway purposes—

(a) The rules for the assessment of compensation which are contained in Clause 2 of the Acquisition of Land (Assessment of Compensation) Act, 1919, should be made to apply.

(b) Promoters should have power to acquire an easement only, where such would be sufficient for the purposes of the undertaking.

(c) Subject to such conditions as may be imposed in special cases, promoters should have an unrestricted power to hold or dispose of surplus land.

We note with satisfaction that, so far as they relate to the customary allowance of 10 per cent., and to the holding and disposal of surplus land, the foregoing recommendations could be carried into effect under Clause 68 of the Railways Bill.

8. The principle of betterment should be more widely recognised and the application thereof should not necessarily be limited to the owner of the property which is to be compulsorily acquired.

9. Future policy should aim at encouraging light railway undertakings by the grant of special facilities by the State and by the larger railway companies. Closer concentration upon this object would tend to obviate or reduce the demand for direct pecuniary assistance from public funds.

10. The poor financial results obtained from light railways in Great Britain have been mainly due, not to failure to exercise economy in working expenses, but to the smallness of the earnings in relation to the capital involved.

11. The possibility of exempting light railway companies from the payment of Corporation Profits Tax should be seriously considered.

12. The revision of the rating of railways should now be seriously considered, with particular reference to the incidence of highway rates.

13. (a) Small undertakings desiring to be classified as "light" railways, and main line companies who may desire certain sections of their undertakings to be so classified, should be able to attain this object without difficulty and with the minimum of expense.

(b) The relative procedure should be as simple as possible, and payment of the fee of £50 which has usually been demanded should no longer be required.

14. (a) Where no connection with a main line is possible, or likely to be required, the choice of the gauge for a new light railway may be determined mainly by considerations of economy in construction and maintenance. Where connection with a main line is proposed or may ultimately be necessary, a narrow gauge should not as a rule be adopted unless the light railway is to have a lead exceeding 20 miles or is to form part of an existing narrow gauge system which could not advantageously be converted to standard gauge.

(b) For narrow gauge lines the dimension of 2 ft. 6 in. should in future be regarded as the standard.

15. Light railways should be classified in two groups with particular reference to the maximum speed authorised for each. This maximum should be 25 miles per hour for lines in Group I. and 15 miles per hour—or such lower maximum as may be agreed to by the Minister of Transport—for lines in Group II.

16. (a) Weights of rail and axle loads permissible should be determined by reference to a sliding scale to be inserted in Appendix VII. to the Requirements with regard to the Opening of Railways, due regard being had to speed, alignment, and traffic conditions. (This suggestion, it is stated in the report, has since been accepted by the committee concerned.)

(b) The power to sanction departures from the sliding scale in special cases should be reserved to the Minister of Transport.

17. (a) Complete schedules of up-to-date model clauses for insertion in draft Light Railway Orders should be printed and made available for the use of promoters, subject to the proviso that the schedule of requirements appended to each order should be left open for settlement on the merits of each case.

(b) The requirements usually specified in this schedule with regard to signalling, points, and cognate matters could not safely be relaxed in favour of the "higher speed" lines included in Group I.; but on the "lower speed" lines included in Group II. no signals should, as a rule, be required.

18. (a) Fencing should be provided only where local conditions, including the speed of trains, render it absolutely essential; and the protection of level crossings by gates and gatekeepers should be similarly limited. (We have indicated in the body of our report the alternative protective measures which should suffice.)

(b) In any case where additional protection may become necessary at a crossing after a line has been opened for traffic the appropriate Government department should have power at any time to require the company to provide such additional protection.

19. (a) Where a road and light railway intersect, a bridge should not be provided except where no economy could be effected by the provision of a level crossing, or where other conditions render a bridge essential.

(b) Undue weight should not be allowed to the arguments adduced by local authorities in pressing for the provision of bridges in lieu of level crossings.

20. (a) Station accommodation for passenger traffic should be more strictly limited, and should take the form of a simple shelter except at important stations. Halts should suffice at wayside places, and wherever it is practicable tickets, fares, and "stamped" parcels traffic should be dealt with by the train guards.

(b) The station facilities provided for dealing with freight traffic should be more closely adjusted to the requirements.

21. Where a new light railway is proposed the question of dispensing with platforms should be considered, especially in the case of a narrow gauge line, where the use of second-hand main line rolling stock is necessarily precluded.

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22. If, on the security of public guarantees, the capital of new light railways were obtainable at par, expenditure on construction would be reduced, and many undertakings which could not otherwise pay a dividend on their ordinary shares would be able to do so.

23. (a) The quantities of rolling stock initially provided for light railways should be more closely adjusted to the traffic requirements.

(b) A determined effort should be made to secure economy in respect of rolling stock by a standardisation of types and parts.

24. Economy may be effected, and traffic increased, by the use of steam or internal combustion rail motor cars for passenger services.

25. Where two classes of passenger accommodation are provided, an unduly high proportion of the total is sometimes allocated to first-class passengers. In many cases the provision of two classes is unnecessary.

26. Advantage would result from a wider use of railway vehicles on tramway tracks. Provided that suitable regulations are applied, and that local conditions render it practicable, we see no reason why tracks on a public road or street should not be used for this purpose.

27. Greater economy is desirable in methods of maintenance and operation; and existing facilities for the handling of traffic should be improved, e.g., by the extension of sidings and other working facilities at stations and exchange points. In this connection the co-operation of main line companies would be of much assistance, and would also benefit the larger companies themselves. Co-operation on the part of the Ministry of Transport, with regard to methods of construction, maintenance, and operation, would also have valuable results, and the readiness of the Ministry to investigate and assist in such cases should be made more widely known.

28. In present circumstances the *Formules d'Exploitation* which have been adopted in France would be inapplicable in Great Britain.

29. (a) We note that the Railways Bill provides for the absorption of certain existing light railways into "amalgamated companies." We suggest that, after the Bill has been passed, the Minister should consider the propriety of encouraging the separation from the main lines of undertakings which are really "light railways."

(b) If Clause 72 of the Railways Bill becomes law, an application by a railway company for an amending order empowering it to acquire a light railway should be granted by the Minister only if he is satisfied that the light railway concerned has changed in character and become competitive; and the order should provide for fair terms of purchase, to be settled in case of difference by arbitration.

30. The principle of voluntary "grouping" of light railway undertakings for purposes of management should be extended. Even where this is impracticable, there should be a closer co-operation in matters affecting the design and repair of rolling stock and permanent way material. Where an undertaking is so located that it could not benefit from a centralisation of repair work, it should at least endeavour to realise economies by the co-operative purchase of materials and stores.

31. Light railways should be emancipated from the influence of the existing standards by which the cost of labour is determined. This cost should be far more closely related to the quality and quantity of the services rendered and to the revenue derivable therefrom.

32. Claims for compensation in respect of loss suffered by light railway companies by reason of the high cost of labour (and said to be due to the action of the Government) should be seriously entertained.

33. Rates and fares should be determined in each case by reference to the economic circumstances of the particular line concerned; and in the apportionment of through rates and fares also, each case should be dealt with on its merits. In this connection the wide difference in the economic positions of light and main line railways respectively should be a basis of consideration, and the general principle that revenue should be sufficient to yield a reasonable return on capital should be borne in mind. In particular, light railway charges should not be based upon any definite *ratio* to main line charges.

34. Light railway companies in Great Britain should be admitted as members of the clearing house, and possess all the privileges of membership except the power of voting.

35. Light railway companies should be represented on all official panels or committees which deal with matters likely to affect such undertakings.

36. Through rates are advantageous to the public, and their institution brings the light railways into closer contact with the main lines, and thereby tends to facilitate the working and exchange of traffic. They are therefore generally desirable, but in particular cases the decision with regard to the adoption of through rates must depend upon local circumstances.

37. In assessing the comparative economic values of road motor transport and light railway services, individual cases must be considered on their merits. Any attempt to direct future development in accordance with a general verdict favourable to either form of transport would be highly misleading. It must be frankly recognised that a road motor service may be a desirable alternative to a light railway, and no such railway should be authorised where it is clear that a road motor service would be equally suitable, and is likely to be established within a reasonable time. Future policy should aim at a solution of the problem by way of co-operation and co-ordination, rather than of competition, between light railway enterprise and road motor transport respectively.

38. A new conception of the character and functions of a light railway is necessary, and it should be recognised by all concerned that light railways differ essentially from main lines, and must depend for success upon the adoption of different standards of construction and operation. In this connection a lower standard of speed is a first essential.

The report states that a questionnaire was addressed to 53 typical light railways in the United Kingdom to obtain up-to-date information, and that the statements of fact supplied, and the practical suggestions offered in response, have been of the greatest value. From information drawn from the official reports of the Société Nationale des Chemins de Fer Vicinaux in Belgium, and from numerous other sources, the signatories have compiled a comprehensive statement concerning the development and practice of light railways in European countries and in India. This document has been embodied in Appendix K to the report. "In the absence of any precise definition of the term 'light railway,' we have deemed it advisable not to accept any narrow classification for the purposes of our inquiry. Differences of type and character abound, and any attempt to circumscribe our investigation in obedience to particular legal or technical distinctions would have detracted from its value. For this reason we have not confined our attention to those undertakings which have been sanctioned by specific 'light railway' legislation; we have taken cognisance also of many lines which have had a different origin but are nevertheless 'light railways' in the ordinarily accepted sense of the term." The committee also point out that having regard to the changes effected by the Government of Ireland Act 1920, the conclusions and recommendations of the committee apply to Great Britain alone.

History, Economic Position, and Prospects.

After referring to the brief history of light railway development in the United Kingdom, as given in Appendix A to the report, the committee state that the evidence before them, including that contained in the annual reports of the Light Railway Commissioners, clearly indicates that in practice the Acts of 1896 and 1912 have not served to foster the development of light railways to an extent comparable with that attained in continental countries. As regards the development and practice of light railways in continental countries, the report states that, as a general rule, the Governments of Belgium, France, and other European countries "have had a very lively conception of the benefits of light railway enterprise, and that, to a far greater extent than our own Government, they have associated themselves directly with such enterprise and have systematically fostered it.

"This intimate association between States, local authorities, and promoters is, indeed, the principal feature which distinguishes continental light railway enterprise from our own. In many instances the foreign lines to which we refer are actually owned by the State, and even where they are not so owned they are frequently subject to the closest supervision and control. We are not convinced, however, that the results achieved have on the whole been such as to prove that an attempt should be made, at this late stage, to foster light railway enterprise in the United Kingdom by the adoption of similar measures. The case of Belgium would, perhaps, appear to furnish some justification for re-fashioning our light railway system upon a continental model," though the report adds that Belgium, as a country, possesses characteristics suitable to its railway system which do not obtain to anything like the same extent in Britain. "The question of public ownership and control raises a political issue which lies outside our mandate as a committee, and we do not feel called upon to frame any recommendation thereon."

"The financial position of light railways generally in the United Kingdom, the report proceeds, is unsatisfactory. There are, it is true, a few undertakings which have attained prosperity or show promise of doing so; but these cases are unusual. Particulars of the receipts and expenditure of a large number of light railways in Great Britain and Ireland (given in Appendix B), taken from the official railway returns for 1913, show that for the last year of normal working prior to the war the great majority of the undertakings concerned yielded only a very small return upon the nominal amount of the capital raised and ranking for dividend. In an appreciable

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number of cases the year's working resulted in an actual deficit. The lines in Great Britain showed, on the average, a return of only about 2·29 per cent. on the capital, whilst even this figure would have been reduced to 1·90 per cent. by the exclusion of two standard gauge lines which carry a heavy industrial traffic and possess to some extent the character of "heavy" railways. In many instances, however, the nominal capital of a light railway company is greatly in excess of the amount of the cash actually subscribed for the construction and equipment of the railway, and that where this is the case the dividend figures do not adequately represent the actual return upon the money invested. At the outset of our inquiry we found it to be a general impression that the financial difficulties of light railways in the United Kingdom were due to the fact that the proportion of working expenses to gross receipts was much higher than in the case of the main line undertakings. The figures contained in Appendix B show that, with regard to light railways in Great Britain, this impression was erroneous. For the year 1913 the ratio in respect of the main lines worked out at 63·3 per cent., and that in respect of the light railways at 66·6 per cent., but in this connection it is only fair to add that the figures in individual cases varied very considerably."

The committee point out that future policy should no doubt aim at a development of traffic itself, and that in order to combat the adverse economic influences arising from the war, it will be necessary to simplify methods of construction, maintenance, and operation to improve exising organisation, to economise in matters affecting the employment of labour and to ensure that rates and fares shall be calculated upon an equitable basis.

Rate of Speed and Rolling Stock.

On the subject of axle loads and weights of rail in relation to speed, the committee state that light railway undertakings generally do not desire the authorisation of speed limits exceeding 25 miles per hour, and they anticipate that in many instances there would be no reluctance to accept an appreciably lower limit if it were clear that this would admit of commensurate economy in construction and operation. "We are satisfied, indeed, that in future many light railways in the United Kingdom may find that a much lower speed limit could be adopted without any real sacrifice of efficiency, and we think that there will be a tendency in this direction. The experience of Continental light railways has shown that this is practicable, and may confidently be expected to lead to considerable economies in construction, maintenance, and working."

Dealing with the cost of light railway construction and equipment, the report says that the cost at July 1921, may be taken as varying between twice and two-and-a-half times the pre-war cost; and it is anticipated that in 1922 prices will not represent, on the average, an advance of more than 100 per cent. on pre-war figures. These estimates, it is added, are, however, highly speculative.

Although as a general rule the quantity of rolling stock at present provided appears to be suitably adjusted to traffic requirements, there is reason to believe that in many cases the original equipment was either inadequate or excessive, and that the adjustments subsequently necessary have been so considerable as to involve either heavy and unforeseen expenditure upon the purchase of additional stock or appreciable loss in the disposal of surplus equipment. The promoters of new undertakings have necessarily been compelled to base their original purchases upon estimates of the probable volume of traffic to be carried, and it was to be expected that such estimates would frequently fall short of or transcend the actual requirements. Nevertheless, we think that greater exactitude might have been attained, and considerable economy effected, if the importance of this matter had been more fully realised.

The same consideration applies, and possibly with greater force, to the question of design. It has not been uncommon in the past for a new undertaking to be equipped with rolling stock of types which have been found subsequently to be unsuitable for, and to militate against, the economical working of the particular traffic. In this connection the committee have been struck by the great variety of design in the rolling stock employed on light railways generally, and are satisfied that the absence of uniformity in this matter has not only prevented undertakings in the same area from assisting each other by the interchange of stock, but has rendered the purchase, maintenance, and renewal of their stock more costly than they need have been. The possibility of common action in this connection is essentially a matter of organisation and management.

The committee refer to the suggestion that ordinary "tramways" might be more widely used for the carriage of goods, and that added advantage would be gained if the width and depth of the groove in tramway tracks were so increased as to admit of the free passage of railway rolling stock. Having regard to the fact that the present standard width and depth of the groove in these tracks have been fixed with due regard to public opinion concerning the safety of certain wheeled traffic, and that an increase in the width and depth of the groove would be necessary in order to allow of the passage of railway stock, they say it is possible that such increase might raise opposition from a certain section of the public in the case of tramways laid on public roads. It should be pointed out, however, that outside Great Britain it is usual for railway stock to be run over tracks laid on public roads and streets; and the committee were much impressed by the advantages thus secured abroad but generally denied in this country. "We think that a similar extension of transport facilities is desirable in the United Kingdom, and has been prevented partly by the traditional tendency to regard the presence of a railway vehicle upon a public road as an impropriety, and partly by opposition due to an exaggerated conception of the risk attendant upon such a use of the highway."

A complete section of the report (IV.) is devoted to road motor transport as an alternative to light railway services. "It cannot be denied," the committee state, "that railway companies generally are feeling the effects of the present competition of motor omnibus and lorry services, and as the rivalry is naturally keenest in respect of short distance traffic, it might be expected that the competitive influence would press most heavily upon the light railways. Few of these possess any considerable length of lead, and there is the further consideration that some of them make no physical connection with the neighbouring main lines, and are therefore unable to transfer traffic to those lines without transhipment. Nevertheless, although the evidence we have received indicates that road motor vehicles are in direct competition with light railway undertakings in many areas, and that the latter in consequence have experienced a certain loss of revenue, this competition has apparently failed so far to deprive them of more than a small percentage of their gross receipts. So far as we have been able to ascertain, no light railway undertaking in Great Britain has succumbed, or shows signs of surrender, and in the majority of cases the loss of revenue involved is serious only because the margins of profit previously realised were so small that any diminution thereof, however small, must be a matter for concern." The report proceeds to discuss the relative position, as regards capital outlay, rates and taxation of light railways and motor vehicle services, and adds—"Apart from the fact that the merits of each form of service for purposes of future development cannot be accurately assessed until it is known what obligations will be imposed upon road transport companies in respect of the making and maintenance of the ways on which they operate, the factors to be considered are numerous, and are not in every case the same. One of the most important of these factors is the volume of traffic to be dealt with, but it will not suffice to consider only the annual ton-mileage and passenger-mileage for which provision must be made. Seasonal and other fluctuations must be taken into account. . . . In determining whether a road motor service or a light railway would be better adapted to meet the requirements in any particular area, the nature, no less than the volume, of the traffic to be carried must be a determining factor."

Motor and Light Railway Passenger Services.

Making a comparison on similar lines, but in respect of a passenger service, the committee assert that there are certain other factors to consider. Motor omnibus services may be, and are being, utilised, in certain circumstances, for journeys of considerable length. For ordinary passenger services the advantages of the omnibus appeal most strongly to the short distance traveller. So long as light railways are practically debarred from using the roads, the omnibus must continue to possess a great advantage, in so far as it can pick up passengers in the streets of towns and villages and at numerous points along the route; and as the omnibus is a much smaller unit than a train, it can usually be run at more frequent intervals.

In concluding the report, the committee state—"One of the broad results of our inquiry has been to confirm our impression that a new and different conception of the character and functions of a light railway is both desirable and necessary. We are convinced that existing notions with regard to the construction and operation of light railways generally are based upon experience originally gained in the construction and working of the great main lines, and that main line traditions have governed and hampered the economic development of the small undertakings. Light railways, in our opinion, should be regarded from quite a different angle. We think that, instead of endeavouring to maintain standards of speed and service somewhat akin to those adopted by main line undertakings, it should be recognised by all concerned that light railways are in an essentially different category, and must depend for their success upon emancipation from main line conceptions of construction and operation. We are satisfied that a lower standard of speed is a first essential, and that with the adoption of such a standard the necessity for elaborate methods of construction and working would largely disappear, with the result that the economic position of the light railway industry could be radically improved, and that without any serious sacrifice of efficiency."

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EDINBURGH TRAMWAYS INQUIRY.

MINISTRY OF TRANSPORT HEARS EVIDENCE IN THE PRINCES STREET CONTROVERSY.

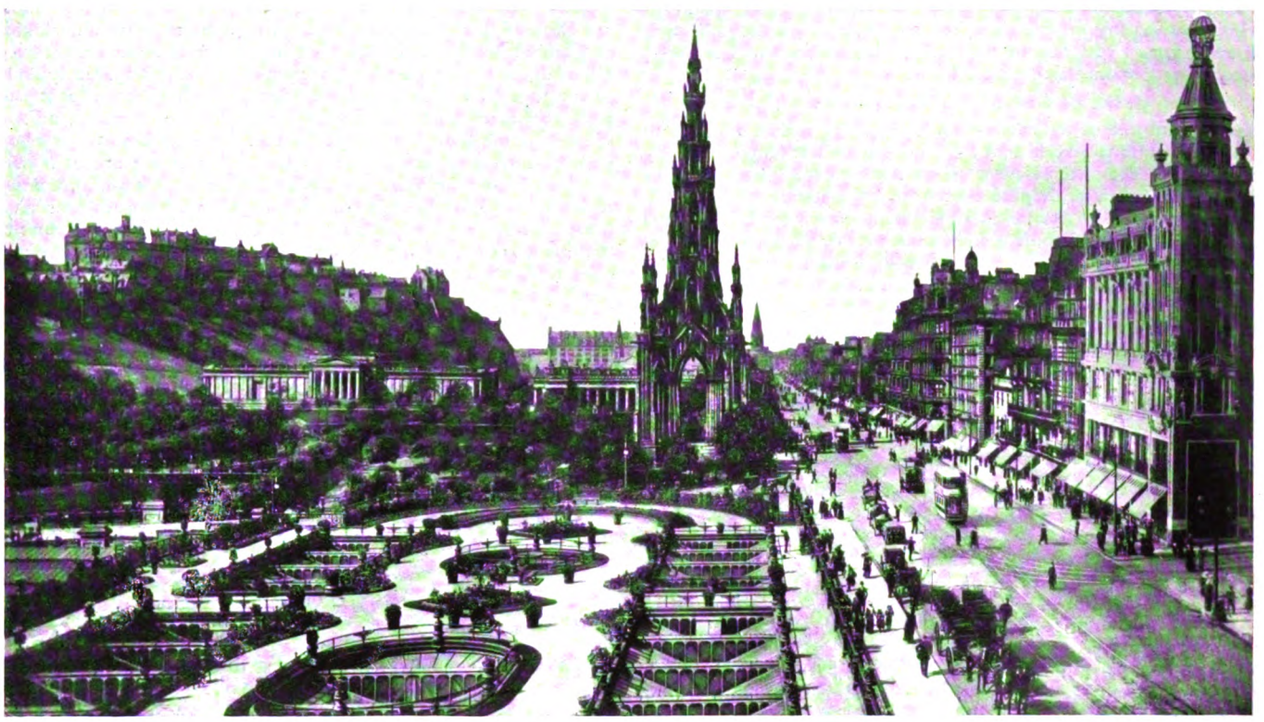
The intense public interest and the controversy aroused by the decision of Edinburgh Town Council to apply for powers to erect central standards in Princes Street when the tramways are electrified culminated on March 29, when the Ministry of Transport opened a public inquiry in the city. The Corporation's statutory application to the Ministry for permission to erect centre poles had been followed by strong representations in opposition. These came chiefly from the Citizens' Protection Committee, the Cockburn Association and motorists' organisations, and were based principally on the grounds of alleged danger to the public safety and of interference with the amenity of the famous thoroughfare. The inquiry was held in Parliament House, and was conducted by Sir William Marwood, K.C.B., and Colonel Pringle, of the Ministry of Transport. There was a large attendance on the first day of the proceedings, among those present being Lord Provost Hutchison, members of the Corporation, and a number of prominent people.

Mr. Graham Robertson, advocate, and Mr. T. M. Cooper, advocate, appeared for the Edinburgh Corporation, instructed by Mr. Grierson, Town Clerk; Mr. Condie Sandeman, K.C., and Mr. D. P. Blades, advocate, for the Citizens' Protection Committee, the Cockburn Association, the Automobile Association and Motor Union, the Scottish Commercial Motor Users' Association, the Scottish Automobile Club, and the Scottish Motor Trade Association, Limited; and Mr. Candlish Henderson, K.C., Mr. Skelton, and Mr. D. A. Guild represented ratepayers and frontagers in Princes Street.

Mr. R. S. Pilcher, general manager of the Corporation tramways, was the first witness. He gave the dimensions of Princes Street as—length, 1,300 yards; width, 96 feet 9 inches; and from kerb to kerb, 67 feet 3 inches. This width was uniform except at the Royal Institution, where the width from kerb to kerb was 50 feet. There were only two outlets on the south—one at the Mound and the other at the Waverley Bridge. Princes Street was practically the artery on which nearly all the tramways converged—75 per cent. of the service would have to pass through Princes Street. The car service at present on Princes Street was approximately 90 cars to the hour, each way, for 16 hours a day. With electric traction they hoped the number might increase. Dealing with the proposed erection of centre poles, Mr. Pilcher said it was intended to use the smallest of the three standard sizes of poles. It was intended to use them also for lighting, employing double brackets to carry two lights. The poles would be fixed 40 yards apart; that meant 32 poles in the length of Princes Street. There were 38 lighting poles at present. If these were removed and the lighting done by the central poles, there would be a reduction of six poles. From the traffic point of view the centre pole system as applied to Princes Street had certain advantages. The poles would regulate traffic in such a wide street so long as they did not cause an obstruction. They already had in Princes Street numerous refuges, and these made a clear line down the street. The drivers of the Corporation omnibuses saw no danger whatever in central poles—in fact, they considered that in some directions they would be an advantage, in that the poles would prevent motorists from coming from one side of the street to the other. With regard to lighting, there would be a distinct advantage, as they would have the light on both sides of the carriageway. It was also economical, as one pole would be used for a dual purpose.

Mr. Pilcher went on to say that overhead traction was a system of proved efficiency. They had about 96 per cent. of the tramway mileage of the country on the overhead system, and about 4 per cent. on the conduit. The cable system had proved itself liable to breakdowns, and he did not think it ever worked with efficiency. The citizens were determined, through the Town Council, to abolish it at the earliest possible moment. One of the greatest disadvantages of the conduit was that all kinds of miscellaneous matter from the roadway got into the slot and caused delay. This difficulty would apply equally to the electric conduit. Wherever tramway managements had gone in for different types of traction in order to avoid wires—at Wolverhampton, Blackpool, and other parts of the world—these had all been done away with. The overhead system was cheaper than the conduit system through the first cost being less and the working expenses considerably less. The central poles might cost a little more, since the rails had to be put further apart than in the case of the span wire system, but they would, on removing the rails, put down new rails, which should be taken into account in the comparison.

Mr. Pilcher explained that there was very little difference between the two systems in working costs. Central poles were preferred by the Corporation to span wires on the ground of amenity. The central poles would cost about £16,000, as against £3,000, but the Corporation were quite prepared to spend that in order to put up what they thought was a better design of equipment from the point of view of amenity. Uniformity of system was an important point. To have two forms of traction, one in Princes Street and another for the rest of the city, where cars of one system had to pass over the other, would cause more complication and extra expense. One might view with less concern a proposal for a conduit system on



The Castle. The Scott Monument.

Princes Street, Edinburgh, with present Cable Cars.

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a route towards the outskirts of the city, but to suggest it for the centre of the present system was a much more serious matter. The bracket arm system could only be suitably used if the track was moved to the south side of the street, and there was there a serious difficulty with regard to the Art Gallery at the Mound. Unless the steps were removed, the lines would have to come out into the middle of the street and would cut into the line of traffic very seriously, just as they would do at the east and west ends. These objections weighed heavily with the Corporation in deciding to keep the track in the middle of the street. On the grounds of both amenity and traffic the centre pole was the best.

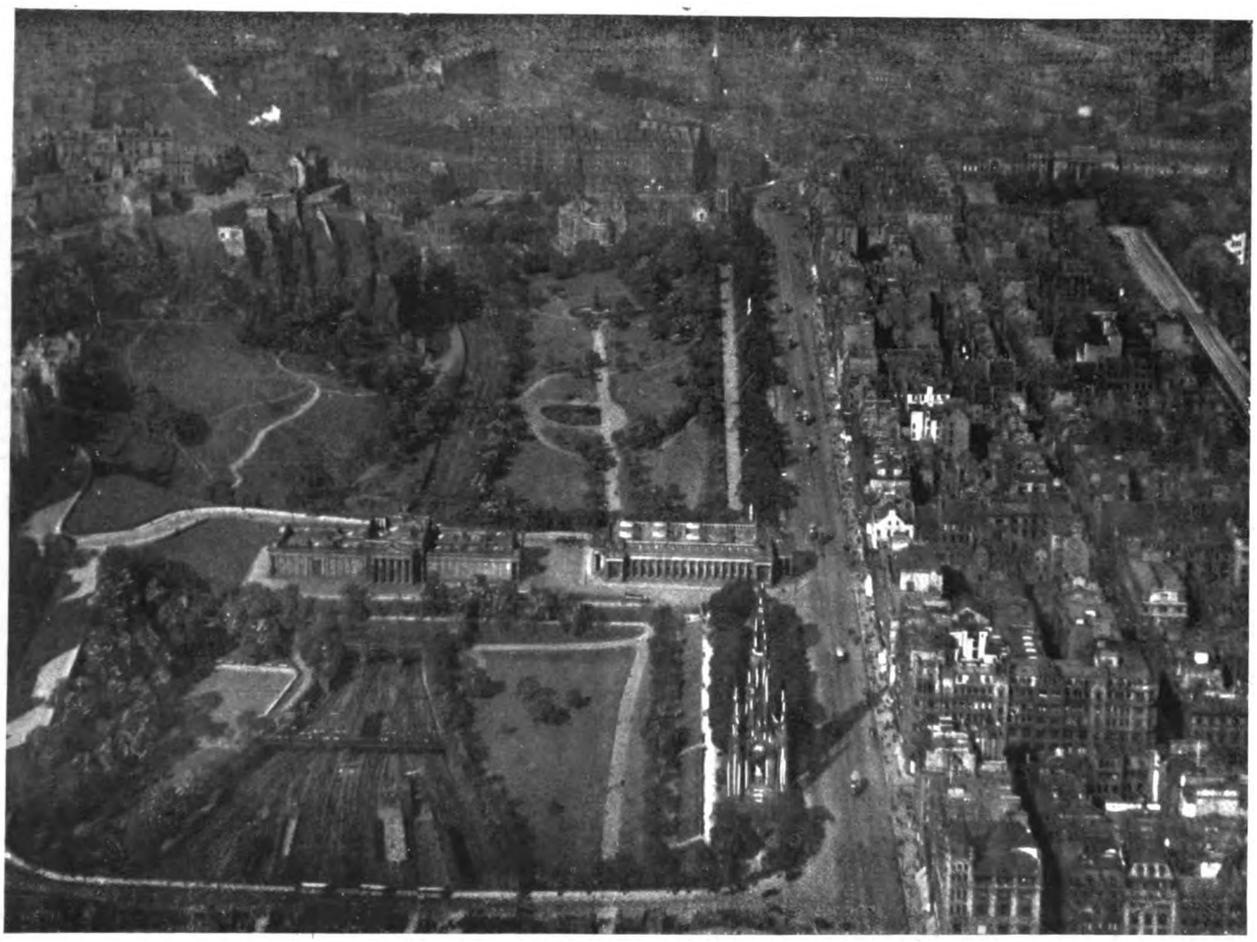
Mr. Pilcher mentioned that he had communicated with all the towns where centre poles had been discarded, but most of the streets in these cases were much narrower than Princes Street. Referring to a proposed alternative that cars should be entirely removed from Princes Street, and that George Street (which runs parallel) should be used, the general manager said this was not at all a convenient arrangement, and enumerated various traffic difficulties. George Street was only suitable as a supplementary route. Turning to the electric conduit system as an alternative, Mr. Pilcher said this would mean that they would have to equip all the Edinburgh cars with duplicate apparatus, and this for a very small piece of the tramway system. They would have to change from the overhead to the conduit, or *vice versa*, twice in 1,300 yards, in some cases twice in 600 yards. These change-over points all indicated a very serious interference with the uniformity and smooth working of the system. Even if the changes were made rapidly, it involved a compulsory stoppage and delay. The possibility of using the present conduit for electrification had been considered by the experts who made the report of 1916. In April 1921, he applied to the London County Council for permission to try their apparatus in Edinburgh. They sent him a model plough, rails, and insulators in order to make the experiment. The London plough would only just go into the slot. They designed a new plough, and succeeded in reducing the width to four inches, but this proved impracticable. It was his considered opinion that the cable tramways conduit would not do for electrification purposes. Mr. Pilcher alluded to inquiries he had made from the Brussels tramways and the Bournemouth Corporation Tramways, the managers of both of which systems had experience of the conduit system and condemned it. He also quoted estimates showing the cost of installing the conduit system and centre poles in Princes Street. The immediate capital cost of centre poles would be £16,851, and conduit construction £59,760. The necessary ploughs for the conduit system would cost £16,500.

Chief Constable Ross, of Edinburgh, said having regard to the exceptional width of Princes Street, he thought it was much more desirable to have centre poles than any other system, particularly because it would divide the traffic. Superintendent Arthur Bassom, traffic adviser to the Metropolitan Police, said he thought that in such a wide street as Princes Street it would make for safety if there were a defined line along the centre of the street, such as centre poles would provide.

At the resumed sitting of the inquiry on March 30, evidence was first given by Mr. Alfred Baker, general manager of Birmingham Corporation Tramways, who said that at the request of Edinburgh Corporation he had carefully considered the proposal to erect centre poles. He thought it was the only possible scheme which any tramway man knowing his business would suggest for a street having the width and importance of Princes Street. In many cases for traffic reasons centre poles had been removed. The minimum width of a road suitable for centre poles was, in his opinion, 50 feet. He could conceive of no better means of dividing the traffic than by centre poles. From the æsthetic point of view he considered that the appearance of the thoroughfare would be improved by such poles; they would give a better balanced appearance to the street as a whole. The persons who proposed to have a conduit system did not understand the difficulties of introducing a conduit in the middle of an overhead system, and there was a very serious difference in capital and working costs.

Mr. Sandeman, cross-examining—Do you think the view of the Castle from clubs in Princes Street would be interfered with by a line of wires? Witness—If Princes Street could be without poles altogether it would be better.

Mr. James Dalrymple, general manager of Glasgow Corporation Tramways, gave evidence as to his experience with the 200 miles



The Castle. The Scott Monument. George Street.

Princes Street and Surroundings as seen from the Air.

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of track in Glasgow, all of which, he said, was on the overhead system. For a road over 50 feet wide he would never suggest anything else than central poles, which he regarded as the only feasible plan for Princes Street. From the æsthetic point of view, he saw no grave objection to their introduction. He had no practical experience of the conduit system, but it was always understood to be more expensive to instal and operate than overhead, and it was not so reliable. There was nothing so reliable as the overhead electric system.

Mr. Robert Paton, the City Chamberlain, made a statement on the financial aspect of the electrification of the system. He was of opinion, based on statistics he had compiled, that the financial position of the electrified tramways would be satisfactory. "I think," he added, "that the Corporation are justified in proceeding with the conversion. The sooner they get the system electrified the better from the financial point of view, for they would begin saving." They wanted efficiency and comparatively cheap transport.

Councillor C. J. Mancor, convener of Edinburgh Tramways Committee, said if a poll could be taken of the ratepayers, they would, in his opinion, have a 9 to 1 majority in favour of the overhead system. The working class were strongly in support of centre poles for Princes Street. The Corporation had to consider economy, because they had not an unlimited purse; efficiency, after their very bitter experience; and, thirdly, amenity. The Corporation had had amenity in view in their decision to put up central poles. He could not honestly say that centre poles would affect the amenity of the street in any way.

Mr. Alexander Smith, J.P., secretary of the Edinburgh and District Trades and Labour Council, and another member of that body, urged the necessity for a cheap and reliable tramway system.

Sir Robert Maule, who said he had had considerable experience in tramway matters as a director of the Edinburgh and District Tramway Company, remarked that it was the duty of the Town Council to settle the matter. He did not think Princes Street would be disfigured by the adoption of centre poles, and he thought the Corporation would not be justified in installing the conduit electric system.

Sir John Cowan said he wanted the Corporation to adopt overhead equipment throughout the system.

CASE FOR THE OPPOSITION.

The case for the opposition to centre poles was opened by Councillor E. Graham Guest, A.M.I.Mech.E., who represented the Scottish Commercial Motor Users' Association. He said he had studied the traffic of Edinburgh streets, and had driven motor vehicles since he was 14. He could hardly believe that anyone who had a knowledge of Edinburgh traffic would put centre poles in Princes Street, which would reduce the carriageway to a minimum. The addition of poles would intensify the trouble in Princes Street. The tramway lines would be moved further apart, and that would make it impossible for two chars-a-bancs to pass on one side. If they put poles in the middle of the street they would diminish the traffic-carrying capacity of the street by one-third. He was certain centre poles would lead to accidents, and would certainly lead to the slowing down of the traffic. Islands were a necessity, but if the islands were going to be swung out the traffic would be more congested, and it would be more difficult for pedestrians to get from one pavement to the other. Councillor W. J. Thomson, director and general manager of the Scottish Motor Traction Company, stated that centre poles in Princes Street would be a positive danger from the traffic point of view.

Professor Sir Richard Lodge gave evidence on the question of amenity. He said that from his point of view wires disfigured any street. In a street like Princes Street such an eyesore became intolerable. It was the fact of spoiling and marring the beauty of what was in the main the most beautiful part of Edinburgh, the best known to all travellers and citizens, one of the three most beautiful thoroughfares in Europe, that made what was tolerated for convenience sake in humbler parts intolerable in Princes Street. If there was an alternative method to wires, even though it was costly and inconvenient, it should be adopted instead of having Princes Street spoiled. Mr. K. Findlater Campbell, C.E., said the conduit system was the only one to apply to Princes Street and its immediate approaches. It was not necessary for all the cars to have ploughs. Mr. Pilcher's estimates of cost and the number of men required to handle ploughs were too high.

Lord Johnston said he had lived in Edinburgh since 1844, and was very interested in the amenity of the place. He opposed centre poles on the ground that they would inconvenience traffic and interfere with the appearance of the town. They would also have a serious effect on the safety of those using the road. Lord Johnston repudiated the assertion that centre poles were necessary for the purpose of dividing the traffic. He said that if a vehicle driver wished to cross over from the Gardens side of the street to the shop side, thereby breaking the line of traffic on the latter side, the task would be rendered much harder if there were six centre poles between every island.

Lord Salvesen stated that he had been a member of the Cockburn Association for 20 years, and he was asked to be chairman of the Citizens' Protection Committee, which had been formed on the publication of the definite scheme now before them. He believed the people of Edinburgh were in entire ignorance of what the Corporation proposed to do until the publication of their proposals for Princes Street. It gave a shock of surprise to the vast majority of the citizens of Edinburgh that any such proposals should be made by the Town Council. Hitherto they had always trusted the Town Council to preserve the amenity of Edinburgh. Amenity was one of the assets of the city for attracting people to it, and from the commercial point of view it was desirable that amenity should be preserved. Lord Salvesen went on to speak of the volume of protests which had been raised against the centre pole scheme, and contended that the Town Council took no notice whatever. Span wires, he said, would be even more disastrous than central poles from point of view of amenity. If the conduit system were used over a total of 3½ miles in the most picturesque parts of the city, the additional annual expense would be relatively extremely small, and would have very little bearing on fares, and they should have preserved the beauty of the town.

Mr. F. C. Mears, architect, gave evidence, and presented photographs bearing on the effect of trolley wires in Princes Street. Mr. A. R. Hoare, civil engineer, Westminster, London, said he had observed the change-over from overhead to conduit on the London County Council system at Streatham, and the average time taken was 20 seconds. In regard to the comparative costs of overhead and conduit in Princes Street, witness said costs had come down enormously since Mr. Pilcher made his estimate. Professor Baily also spoke in favour of the conduit system. Councillor A. Millar said if the Ministry of Transport did not consider the question in the light of the resolution of the Town Council, they would defeat the ends of local government. Professor Wallace urged that the tracks should run along the south side of Princes Street, and leave the centre of the street for traffic.

This concluded the evidence, and after counsel for the respective sides had addressed the court of inquiry, Sir William Marwood announced that he and Colonel Pringle would make a report to the Minister of Transport, with a recommendation added.

SETTLEMENT OF NEWCASTLE TRAMWAYS STRIKE.

Employees Accept Committee's Terms.

The strike of the employees of the Corporation Tramways ended on Sunday, March 19, after having lasted three weeks, and the car service was resumed on the following day. On the previous Saturday the men held a ballot to decide whether to hold out for the 44-hour week or to accept the latest offer of the Tramways Committee. This was that the working week should be of 48 hours, and that the full terms of the National Agreement should be observed. The result of the ballot was as follows—For acceptance, 887; against, 185; majority for acceptance, 702. Although this decision indicated a strong desire to resume work, the men were in doubt as to how their action would affect the members of other unions who were also on strike. The difficulty in respect of them was referred to a meeting of their representatives and the Transport and Electricity Sub-committee. At the conclusion of this meeting a statement was issued by the committee in which they said that they had met representatives of about 240 men employed in the tramways power-station and car works, who, in common with the motormen and conductors, had been asked to work the hours recognised by their respective unions instead of the 44-hour week formerly fixed by the City Council. Notwithstanding the result of the ballot of the vehicle workers, the other unions stood out for a 44-hour week, and were not prepared to accept the result of the ballot. The committee informed the deputation that they required the whole of their employees to work the hours recognised by their unions in the same way as has been agreed by the vehicle workers. At a meeting of the tramway employees (vehicle workers) on Sunday night, the following resolution was adopted—"That we accept the ballot vote as taken on Saturday, and return to work to-morrow. In the event of any of our members being instructed to do the work of the men on strike, they shall be instructed to refuse to blackleg." Most of the employees engaged in the power-station and the car maintenance shops resumed work after being on strike for a month. The Transport and Electricity Committee advertised on March 24 for new employees, and received over 500 applications. Twenty of the men had been engaged when the committee were informed that the regular employees were prepared to resume work.

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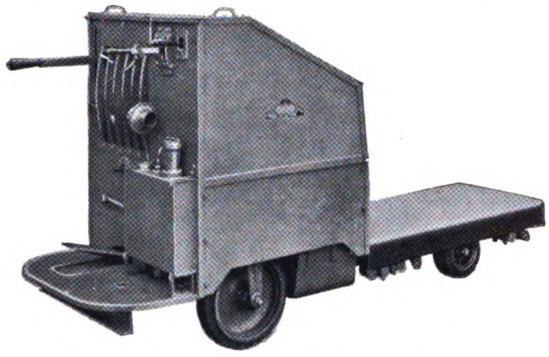
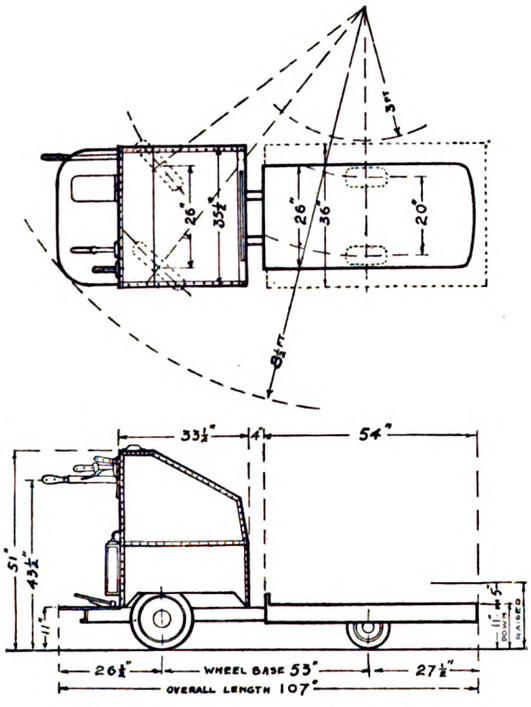
THE CLARK "TRUCLIFT" SELF-PROPELLED TRUCK.

The use of small self-propelled trucks for transport purposes in and around industrial plants has made great headway during the past few years. For work of this kind the best kind of truck is undoubtedly a self-contained unit, which will give the utmost flexibility in use, and be always ready for service. A novel truck, which fully meets the above requirements, is the Clark "Truclift," a self-contained petrol-driven machine, which is being supplied by the machinery department of Messrs. Millars' Timber and Trading Company, Limited, of Pinners' Hall, Great Winchester Street, E.C.2.



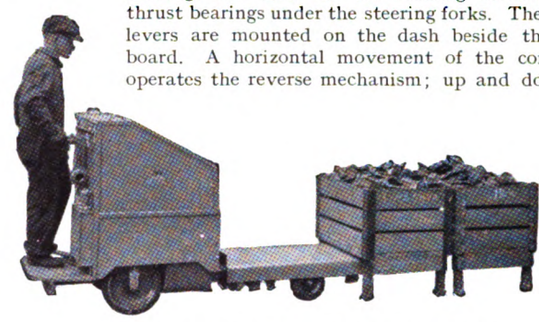
The Clark "Truclift" Self-Propelled Truck.

The "Truclift" has the added advantage that it is provided with a lifting platform, enabling the operator to load and unload the machine without dismounting, where goods are stored on suitable platforms. As the "Truclift" is under 3 ft. in width, it can operate in a narrow aisle; it will carry a load of 4,000 lb. up a grade of 11 per cent. on low gear; and it will turn round an inner radius of 3 ft.



Plan and Elevation of the "Truclift."

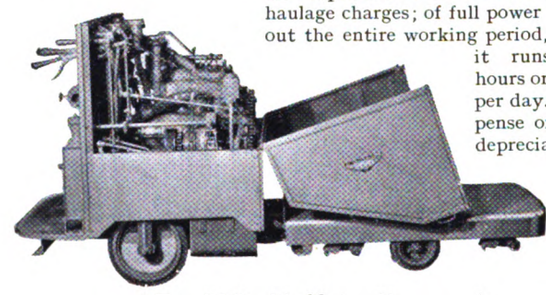
The "Truclift" is a four-wheel truck, built with a rivetted channel frame and fitted with a 4-cylinder petrol engine, with enclosed valves, high-tension magneto ignition, impulse starter, fixed spark, thermo-syphon cooling, and oil circulating pump. The engine is governor controlled, running at a speed of 1,000 revolutions per minute. It drives a two-speed gear of the planetary type, and a pressure pump (for operating the lifting platform) by means of a roller chain. From the gear the drive is through a reverse box and propeller shaft to the front or driving axle, the latter being bevel driven. The overall reduction in high gear is a trifle over 5 to 1, and in low gear 15½ to 1. The maximum speeds of the truck in either direction in high and low gear are six and two miles per hour respectively. The engine-driven pressure pump previously referred to forces light oil into a lift cylinder working under a pressure of 240 lb. per square inch, when lifting a load of 4,000 lb. on the platform. The lift cylinder has a stroke of six inches, and it operates a series of lifting levers through a rack and gear segment. This lift gear will operate the 4,000 lb. load from the minimum height of 11 in. above the floor to the maximum height of 16 ft. in eight seconds. The lift can be stopped at any point by the control lever. The truck brake is operated by a foot pedal on the running board, the brake being applied automatically when the driver removes his weight from the pedal. A carefully thought out system of lubrication is provided to all parts—high grade ball and roller bearings are used in the running mechanism and thrust bearings under the steering forks. The operating levers are mounted on the dash beside the running board. A horizontal movement of the control lever operates the reverse mechanism; up and down move-



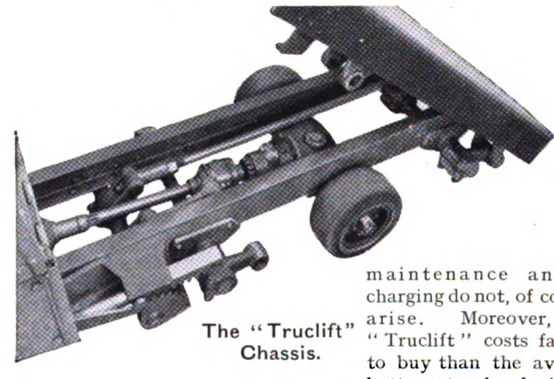
The "Truclift" Carrying a Load.

ments operate the slow and high speed gears respectively. There is a natural dragging effect present in the transmission, due to the planetary gears running over one another in the lubricant, and this provides a means of delicately manœuvring the truck, when operating the reverse, by slightly releasing the brake.

In conclusion, it may be pointed out that the "Truclift" is intended to compete with the electric battery truck, over which the makers claim that it possesses the advantage of greater mobility; of decreased weight, owing to absence of a storage battery, which also represents a continuous saving in haulage charges; of full power throughout the entire working period, whether it runs for 2 hours or 24 hours per day. The expense of battery depreciation and



"Truclift" with Motor Uncovered.



The "Truclift" Chassis.

maintenance and of charging do not, of course, arise. Moreover, the "Truclift" costs far less to buy than the average battery truck of similar capacity. The "Truclift" is a strongly built machine, constructed by the makers of the Clark "Tructractor," the well-known three-wheel dumping truck supplied by Messrs. Millars for handling contractors' materials and in use on various road construction contracts.

Removal of Centre Poles in Glasgow.—A joint meeting of Glasgow Corporation Statute Labour, Tramways, Watching and Lighting Committees have recommended the removal of the central tramway standards in Great Western Road to the side of the thoroughfare.

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FINANCIAL REPORTS AND MEETINGS.

LOSS ON THE EAST HAM TRAMWAYS.—A loss of £17,000 is reported on the East Ham Corporation Tramways for the nine months ended December 31, 1921.

LEEDS TRAMWAY ESTIMATES.—No profit is expected on Leeds Corporation Tramways, as any surplus will be absorbed in clearing off the current year's deficit.

G. D. PETERS AND COMPANY, LIMITED.—The net profit for 1921 was £5,791, and including the sum of £15,342 brought in, there is a disposable balance of £21,133. A dividend on the ordinary shares of 2½ per cent. per annum is recommended, carrying forward £12,357.

W. T. HENLEY'S TELEGRAPH WORKS COMPANY.—After providing for depreciation and debenture interest, the net profit for the past year amounts to £224,739, against £193,027 for 1920. The sum of £22,879 (against £18,432 last year) is placed to reserve, and the board recommends a balance dividend on the ordinary shares of 2s. per share, making 3s. per share, or 15 per cent., less tax, for the year, being the same as for 1920. The carry forward will be £260,243.

BRITISH ALUMINIUM COMPANY, LIMITED.—The net profits for 1921 were £83,817, and £15,314 was brought forward. A final dividend of 2½ per cent. is proposed on the ordinary shares, making 5 per cent. for the year, adding £20,000 to the depreciation reserve (making that fund £570,000) and £10,000 to the general reserve (raising it to £180,000), and carrying forward £19,534. The company's net profits for 1920 were £237,612, and the ordinary shares received 10 per cent.

THE BRUSH ELECTRICAL ENGINEERING COMPANY'S report for the year ended December 31, 1921, shows a substantial improvement in earnings. The gross profit amounted to £232,600, as against £191,100. A dividend on the ordinary shares is recommended at 15 per cent. The depreciation allowance is raised from £13,000 to £15,000, and £73,200, as compared with £43,400, is transferred to the general reserve, bringing the total to £150,000. Subject to taxation, the carry over is £214,074, or £70,800 more than a year ago.

STEWARTS AND LLOYDS, LIMITED.—After providing for income-tax and corporation tax, the board recommend a dividend on the fully-paid deferred shares Nos. 1 to 850,000 and Nos. 1,700,001 to 2,630,030, inclusive of 10 per cent. and a bonus of 2½ per cent., together 12½ per cent., tax free, for the year 1921. The deferred shares (fully paid from September 30, 1921), Nos. 850,001 to 1,700,000 inclusive, will receive a dividend to December 31, 1921, of 7½ per cent., and a bonus of 1⅞ per cent., both tax free. The sum of £70,000 is again set aside for depreciation, while £230,000 is placed to reserves, against £150,000 last year, £10,000 (same as a year ago) to employees' benefit reserve, and £180,000 carried forward, against £110,000 brought in.

ARGENTINE TRAMWAYS AND POWER COMPANY, LIMITED.—The report for the year to September 30, 1921, states that net receipts from operation totalled £28,028, an increase of £5,442, and total revenue £28,559, against £26,893. A scheme of arrangement approved by holders of preference and ordinary shares on March 22 provides, *inter alia*, that £18,323 standing to the credit of the revenue account at September 30, 1920, shall be carried to reserve, and shall not be treated as profit available for dividend. Subject to the scheme being approved by the court, and to £50,000 of 5 per cent. debenture stock, subscriptions for which have been conditionally promised, being allotted, the directors propose dividend at the rate of 5 per cent. (less tax) on preference shares in respect of past year, carrying forward the balance.

BRUCE, PEEBLES AND COMPANY, LIMITED.—The annual report shows that the profit for the year amounted to £113,793, and including £5,823 brought forward, there is a balance of £119,616. This sum has been appropriated as follows—To taxation reserve account, £40,000; depreciation reserve account, £10,000; general reserve account, £32,221. A full dividend for the year on the preference shares of 10 per cent., less income-tax, and a dividend on the ordinary shares of 10 per cent., with a bonus of 5 per cent. (both less tax, payable on March 31) require £29,476, leaving a balance of £7,919 to be carried forward. The output from the works was the largest in the history of the company, and the directors regard the results as satisfactory. The prospects for the current year are said to be good. The reserve account now stands at £100,000.

BRISTOL TRAMWAYS AND CARRIAGE COMPANY.—Progress in revenue is again shown in the report for the year ended December 31, 1921, while working expenses were somewhat lower. Revenue was £1,022,208, and working and general expenses and renewals £951,589, leaving with balance brought forward, together with an amount recovered on an adjustment of income-tax, a net revenue of £104,100. It is proposed to pay a final dividend on ordinary shares of 4 per cent., free of tax, making 7 per cent. for year, carrying forward £3,668. After charging expenses of issue of new ordinary shares and adjusting value of investments at December 31 last, the reserve fund amounts to £339,557. Receipts of tramways department show increase of £112,186, and carriage department decrease of £7,996. Number of passengers carried was 72,301,531, decrease of 12,681,903. At the annual meeting held on April 6, Mr. Samuel White (the chairman), who presided, said they had had a very hard year's work, and the results of it, on the whole, were more satisfactory than might have been the case. He intimated that the company contemplated foregoing the 2d. minimum fare, and re-introducing the 1½d. minimum.

CAMMELL, LAIRD AND COMPANY, LIMITED.—The annual meeting was held at Sheffield on April 6, Mr. W. L. Hichens (the chairman) presiding. Mr. Hichens said the industries of this country had every reason to feel confident that they would win back the commercial supremacy of the world. He thought they were justified in claiming that the Government and local authorities should follow suit in the economies that were being practised elsewhere. While they, as a firm, had not so much work on hand as a year ago, yet he believed they could hold their own in the future against any of their competitors. He thought it unlikely that an improvement in trade would come early enough to make the present year a good one, but the clouds would break some day and the sun would shine. The assets of the company had been well written down, and they were in a position to render a very good account of themselves as soon as the present depression was over. Never had there been such a complete and sudden transition from high prices and booming trade to utter stagnation and collapse. The real key to the whole problem was that we had got to get prices and costs down to the lowest possible level before there could be industrial prosperity. In some lines, possibly, prices had already come down as low as was practicable, but in others they had not, and it was essential there should be a uniform reduction. A dividend is recommended on the ordinary shares of 5 per cent. for the year ended December 30 last, carrying forward £38,637. The additional capital created in 1920 now receives a dividend for the first time. In 1920 the dividend was at the rate of 7½ per cent., and the balance carried forward was £71,471.

METROPOLITAN-VICKERS ELECTRICAL COMPANY.—The annual meeting of the Metropolitan-Vickers Electrical Company, Limited, was held in London on April 5, Mr. J. Annan Bryce (the chairman) presiding. Mr. Bryce said the profit available for the year was £440,342, or nearly £40,000 in excess of that of 1920. This was satisfactory in view of the depression in trade during the year. Orders received were considerably fewer than in the preceding year, but the shops were kept fully employed, owing to the number of orders remaining unexecuted at the beginning of the period. As a result of the year's operations, they were enabled, after allocating £35,000 to special depreciation, and raising the general reserve to £400,000, to increase the carry forward by £33,991. Alluding to orders received recently by the firm, the chairman said that for these there had been keen competition, the object being to keep the works as fully employed as possible. One large order, running into about a million pounds, for the supply of electrical railway equipment to the South African Government, they had been fortunate enough to secure during the current year in face of severe competition from both America and the Continent. The traction department, of which Mr. P. S. Turner was the head, was to be congratulated on the work that it did in obtaining this order. In their own particular industry a renewal of activity was expected in connection with the schemes for co-ordination of power supply and electrification of railways, in the orders for which this company, with technical equipment second to none, was entitled to hope for a fair share. After referring to the engineering trade dispute, and to the continuance of "the most cordial harmony" within their own works between the management and employees, Mr. Bryce said the output of the year had been the largest during the history of the company, exceeding by 35 per cent. the output of 1916. He alluded to the loss the company had suffered by the death of Sir Francis Barker, and said it had been decided to invite Mr. Douglas Vickers, head of the great organisation which bore his name, to take the vacant place on the board. The directors recommended the payment of a dividend on the ordinary shares of 12½ per cent., less income-tax, for the year ended December 31 last.

HADFIELDS, LIMITED.—The accounts for 1921 show a profit of £158,157, and a balance dividend of 2½ per cent. is recommended on the ordinary shares, making 5 per cent. for the year, tax free, being the same as for the previous year. The "carry forward" is reduced from £135,727 to £122,657. It is stated that adjustments may be necessary to meet the provisions of the Munitions and Finance Acts. The coal miners' dispute greatly affected the working of the company. The directors state that owing to the considerable volume of orders in hand at the beginning of the year under review the effects of the general depression in the engineering industry were not acutely felt until the latter part of the year. In pursuance of an agreement designed to promote community of interests, the company invested

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£25,000 in the Vulcan Foundery, of Newton-le-Willows, Lancashire, one of its oldest customers, and the Vulcan Foundry have invested a like sum in Hadfields. There are now signs of an improved demand for the American company's products, and that the expectations which were formed by the directors in developing this new field will mature. As part of the scheme of arrangement sanctioned by the Court in the affairs of A. Harper, Sons and Bean, the directors of Hadfields have arranged for the exchange of the greater part of the latter company's holding in Harper Bean for a holding in A. Harper, Sons and Bean, the manufacturing company, and the chief consumers of Hadfields' material. Towards the scheme of reconstruction Hadfields has undertaken to subscribe £50,000 of the first debenture required for additional working capital, and will be represented upon the new board. Hadfields' new steel foundry which forms an important part of the adaptation of the company's war extensions to peace purposes, is now completed, and has for some months been working successfully. It will, it is stated, undoubtedly provide a profitable addition to the company's resources when the general conditions of trade improve. The two smaller rolling mills are also now working successfully, and the large cogging and billeting mill is approaching completion, and will be available for useful service so soon as the opportunity arrives through a revival in trade.

TRAMWAY AND LIGHT RAILWAY NOTES.

BELFAST.

TRACK RECONSTRUCTION.

At a meeting of the City Tramways Committee the general manager (Mr. J. S. D. Moffet) submitted a report on two alternative proposals for permanent way reconstruction in 1922. These were—(1) For proceeding with the second instalment as outlined in the principal report of last year; and (2) for a modified instalment dealing with the sections most in need of repair. It was decided to advertise for alternative tenders.

BIRMINGHAM.

MOTORMAN'S COMPENSATION.

A former Corporation tramcar driver, aged 64, applied at the County Court under the Workmen's Compensation Act for the restoration of a weekly payment. Counsel for the applicant said in November 1915, he was seriously injured in a tramway accident, and was treated by a doctor until July 1916. Up to June 19, 1916, he was paid 19s. a week compensation. Payment ceased upon an agreement for a declaration of liability being recorded. The applicant resumed work under the Corporation until January 15, 1922, when he reported sick. The applicant's case was that at present, in consequence of the accident, he was incapacitated from work, and medical evidence was called. The respondents denied liability on the ground that any incapacity was not due to the accident. The Judge awarded compensation of 20s. a week, with the usual war additions.

CARDIFF.

CORPORATION AND THE TRAMWAYS COMPANY.

The City Council have given plenary powers to a sub-committee of the Tramways Committee to deal with the proposed purchase of the undertaking of the Cardiff Tramways Company. Councillor Sydney Jenkins (chairman of the Tramways Committee) said it would facilitate matters if this were granted, as there was a tremendous difference between the sum required for the undertaking and the amount the committee were prepared to pay.

CHESTER.

RECONSTRUCTION OF THE TRAMWAYS.

The Tramways Committee have again considered the report on the undertaking prepared by Mr. A. R. Fearnley (general manager of Sheffield Corporation Tramways), which was summarised in our issue of December 17, 1921. They also received reports from the City Surveyor and the Acting City Accountant. The committee decided to recommend the Council (1) that the tramways be maintained as at present laid out for a further period of seven to eight years, at the end of which period the full life of the track will have been obtained; (2) that the recommendation set out in Mr. Fearnley's report be carried out, and that the City Surveyor be authorised to proceed with the work at a cost of £12,000, and report to the committee as to progress from time to time, and that he be empowered to obtain the workmen, plant and materials necessary for the work; (3) that the cost of the work be defrayed out of the reserve fund of the tramways undertaking.

DONCASTER.

SANCTION FOR TRAMWAY IMPROVEMENTS.

The Ministry of Transport intend to make an order conferring upon the Corporation powers to extend and improve the tramway system by the construction of a loop through Trafford Street and Factory Lane, and by alterations in Baxter Gate and St. Sepulchre Gate, in accordance with the scheme outlined in the Corporation's recent application. The scheme will abolish the present Frenchgate terminus for the Brodsworth and Bentley cars.

HULL.

TRAMWAY PROFITS RELIEVE RATES.

The City Council has adopted the recommendation of the Finance Committee that £10,000 of the tramway profits should be allocated to the relief of the rates.

KEIGHLEY.

INCREASED FARES.

The minimum fare on the Corporation Tramways was increased from 1d. to 1½d. on April 1. The Town Council have declined to sanction a proposal to borrow £40,000 for track reconstruction.

LEICESTER.

TRAMWAYS EXTENSION.

The City Tramways Committee have decided to proceed immediately with the installation of the electrical equipment on the Welford Road route, and open the section for traffic at the earliest possible date. They point out that on May 26, 1914, the Council decided to construct the section. After the completion of the track and certain overhead equipment the works had necessarily to be suspended in consequence of the war.

LIVERPOOL.

FARES INQUIRY.

The Corporation made an application to the Tramway Charges Advisory Committee at the Ministry of Transport on March 14, to be allowed, under the Acts of 1918 and 1920, to continue until February 15, 1923, charges not exceeding those at present operative on the undertaking in the city of Liverpool, the borough of Bootle, and the urban district of Litherland, and in respect of the tramway or light railway between Liverpool and Prescot. Mr. F. W. Pierce, Deputy Town Clerk of Liverpool, accompanied by Messrs. Frank Wilson (chairman of the Tramways and Electricity Committee), P. Priestly (tramways manager), and R. Barrow (City Treasurer) were present on behalf of the Corporation. Bootle Borough Council opposed the application, and Litherland forwarded a letter saying that the increased fares were a great hardship, and pleading for the restoration of the penny ticket. Mr. Pierce said notwithstanding certain increased fares in 1920, the expenses were £1,490,625 and the revenue £1,457,549, leaving a deficit of £33,076, and in addition the whole of the reserve fund had been exhausted. The fares were increased by statute in 1921. The deficiency in that year was not so great as was expected. Expenses were £1,607,542, revenue £1,558,906, and the deficiency £48,636. Mr. Priestly said the expenses of the system had risen 239 per cent. since 1913, but fares had only increased 38 per cent. Mr. Wilson said a return to the old fares would mean a loss of £300,000 a year. Mr. Tumilty said Bootle, with its labouring population, wanted a return to the penny fare for short stages. (The present minimum fare in Liverpool is 2d.)

LONDON.

THROUGH SERVICES AND BOOKINGS.

With the completion of the work of lowering the roadway under the railway bridges at Clapham and Balham stations, the London County Council tramway authorities on March 24 commenced running the new class E/1 cars on the Clapham, Balham and Tooting route. These cars have the overhead trolley arm as well as the underground connection, and when the work of joining up the track at Merton with the London United Tramways is completed, it will be possible to run a through service from Victoria Embankment to Wimbledon Station.

At the meeting of the County Council on March 28 the receipt was reported of a communication from the London General Omnibus Company intimating that owing to the poor receipts on the service of omnibuses from Charing Cross (Embankment) to Cricklewood the service would be discontinued as from March 22. This withdrawal of the service involved the discontinuance of through bookings between points on the Council's tramways and Piccadilly and Oxford Circus, as there is no other direct service to these points from the Embankment. The Highways Committee recommended that an agreement be made with the Metropolitan Electric Tramways, Limited, for the withdrawal of all short running cars turning at Finsbury Park, and the substitution of through services; for the payment by the company to the Council of 10·5d. a car-mile in respect of the car mileage run by the Council in excess of its proportion under existing through running arrangements; that the arrangement remain in force for six months, and be terminable on September 29, 1922, on one month's notice on either side, or thereafter on three months' notice on either side.

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CONTRACTS AND ORDERS.

The British Thomson-Houston Company's tender for main E.H.T. switchboard extension has been accepted by Warrington Corporation.

The Pirelli General Cable Works, Limited, are supplying 4-core cable to Birkenhead Corporation. The amount of the contract is £1,007 15s.

Bradford Tramways Committee have accepted the tender of the Kirkstall Forge Company for the supply of 14 steel axles required for trolley vehicles, at the total price of £1,182 14s.

The Woods Gilbert Rail Remodelling Company, of 170 Strand, London, W.C., are now carrying out the repair of Exeter Corporation tramway track by means of electric arc welding and rail grinding.

J. W. Courtenay, Limited, of Amberley House, Norfolk Street, London, W C.2, have been appointed sole advertising contractors for Ipswich Corporation Tramways and Birkenhead Corporation Ferries.

Wallasey Corporation have accepted the tenders of United Water Softeners, Limited, for water-treating plant for the electricity department, £1,368; and Metropolitan-Vickers Electrical Company for switchgear, £2,600 10s.

Clough, Smith and Company, Limited, of 36 Victoria Street, London, S.W.1, have arranged a contract with the Eston Urban District Council for the supply and erection of the overhead equipment, comprising 700 poles, etc., and the supply and laying of about 4½ miles of underground mains in connection with the town lighting of South Bank, Grangetown, Normanby, and Teesville.

Metropolitan-Vickers' New Zealand Order.—A Reuter message from Wellington, New Zealand, states that the Government have accepted the tender of the Metropolitan-Vickers Electrical Company, of Manchester, amounting to £30,764, for the supply of switch gear for the Mangahao hydro-electric installation, which will provide the Wellington district and city with electrical power. The installation will have the highest electrical pressure in Australasia and the best and most reliable controls were necessary. The lowest tender received was one for £24,666 from America.

Short Brothers (Rochester and Bedford), Limited, of 20-30 Charing Cross, London, S.W.1, have secured a further contract from the London General Omnibus Company for 250 of their "S" type omnibus bodies. Deliveries on this contract alone will total 20 complete bodies mounted on chassis per week. The new order will bring the total number of bodies built for the London General Omnibus Company to nearly 600. Messrs. Short Brothers have in hand also other large orders for Railless, Limited, the East Kent Road Car Company, Salsom Cars, Limited, etc. All these orders necessitate quick deliveries at competitive prices.

Electrification in Holland.—The Zeeuwsch Vlaamsche Tramweg Company, of Axel, Zeeland, according to the Dutch newspaper *Handelsbelangen*, propose laying a tramway, with power-station, depots, etc., in Zeeland. It is intended to make a start on the work at the end of this year, and the plans will probably be drawn up by W. E. Kramer and H. Polano, engineers, 18a Noordeinde, The Hague. The same paper reports that the granting of a concession for the electrification and extension of the Gooische Stoomtram may be expected this year. The line from Amsterdam to Hilversum will be the first to be electrified, and a power-station and annexe buildings will be constructed in connection with the scheme. The director of the company is F. M. Augustijn, of Watergraafsmeer.

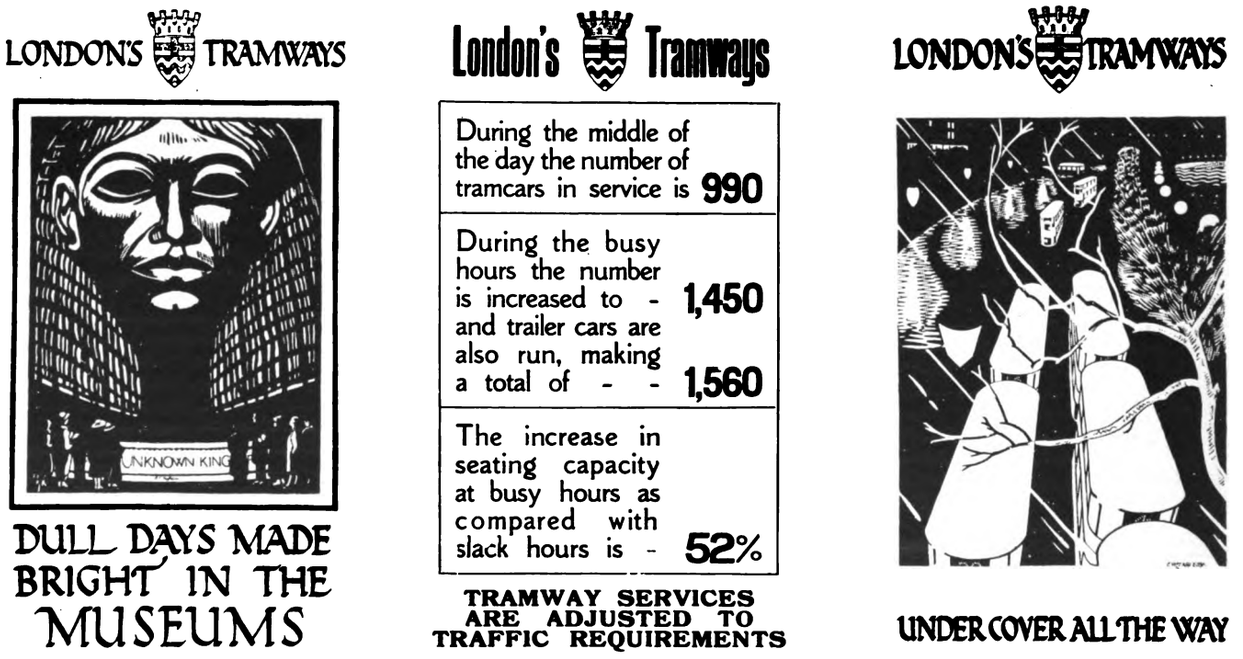
The Edinburgh Corporation Tramways Committee have recommended acceptance of the quotation of a German manufacturer in Cologne for 130 tons of tramway rails and five tons of fishplates. The German firm quoted, through their British agent, £1,365, and the nearest British offer was £1,495. Bailie Sleigh and Councillor Couston opposed acceptance of the foreign quotation. The committee also unanimously recommended the tender of another German firm for steel poles. The British quotation was £7,977, as against £5,436 by a Dusseldorf firm. The Town Council, however, declined to confirm the Tramways Committee's proposals and decided to allocate the contracts as follows: for the supply of rails and fishplates, Dorman, Long and Company, Middlesbrough; for the supply of steel poles, Stewart and Lloyds, Limited, Glasgow.

INTERNATIONAL RAILWAY CONGRESS.

The International Railway Congress will be held at Rome from Tuesday, April 18, to Friday, April 28, in the Palais de l'Exposition Nationale. M. Tondolier, of the Belgian State Railways, will preside. The Ministry of Transport will be represented by Col. J. W. Pringle, chief inspector of railways, and Sir W. M. Acworth. There will be an official reception at the capital, and the delegates will on Wednesday, April 19, be the guests of the Italian Government at dinner. Among the subjects to be discussed is that of railway electrification.

BRITISH TRAMWAYS IN MONTE VIDEO.

Despite formal protest by the British Foreign Office, the municipality of Monte Video, Uruguay, continues forcibly to control the funds of the British tramway company in that city, it is reported. The municipality has extracted a further sum from the company's coffers to pay the increase in wages in respect of the first fortnight in March. The extraordinary situation disclosed originated in the refusal of the Uruguay Government, at the instance of the Socialist group in the Chambers, to grant permission to the tramway company to raise its tariff. The company being therefore unable to grant the men increased wages, a strike ensued, whereupon the municipality ordered the men back to work and itself seized control of the company's property and paid the increase out of the company's funds. The company is taking legal action against the municipality.



SOME RECENT POSTERS ISSUED BY THE L.C.C. TRAMWAYS.

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PERSONAL.

Mr. Charles W. Matthews has been appointed chairman of the Highways Committee of the London County Council.

Mr. John Craig has been elected president of the National Federation of Iron and Steel Manufacturers for the ensuing year.

Mr. J. A. Forde, engineer and general manager of the Isle of Thanet Electric Tramways and Lighting Company, Limited, has been appointed a Justice of the Peace.

Mr. Arthur Ellis has been asked by the Hull Corporation Electricity Committee to report on their electric supply undertaking from the technical and commercial point of view.

Mr. W. J. Gray, late of the Goodyear Tyre and Rubber Company, Limited, has now joined Messrs. Leo. Swain and Company, Limited, as tyre department representative for the Fylde and East Lancashire districts.

Mr. C. P. Sandberg, C.B.E., has been appointed by the Ministry of Communications of the Chinese Government, Pekin, as technical delegate at the International Railway Congress, which opens at Rome on April 18.

Mr. A. H. Martin, who was with the Bristol Tramways and Carriage Company, Limited, in various capacities for over 16 years, and latterly has been traffic superintendent of the Northern General Transport Company, has been appointed to the position of outside manager for the Crosvile Motor Company, Limited, Chester.

Mr. G. H. Hume has been elected alderman of the London County Council. As formerly for several years chairman of the Highways Committee, Mr. Hume's services to the London County Council Tramways are well known, and his election as alderman is a well-merited recognition of the valuable work which he has done on this and other important committees.

Councillor T. Canby, deputy chairman of the Huddersfield Corporation Tramways Committee, has been appointed chairman of the committee in succession to the late Alderman E. H. Sellers. Councillor Canby became a member of the Tramways Committee in 1911, and in 1915 was appointed deputy chairman. **Councillor T. Woffenden** has been elected deputy chairman.

Birmingham Corporation Tramway Officials.—The principal officials of the Birmingham Corporation Tramways, in addition to Mr. A. Baker, the general manager, are now as follows—Assistant general manager, Mr. J. McDonnell; chief engineer, Mr. A. C. Baker; electrical engineer, Mr. T. Rowland; permanent way engineer, Mr. G. Warner; traffic superintendent, Mr. L. Johnson. Councillor Frederick Smith is chairman of the Tramways Committee.

Mr. Harry A. Blackburn, M.I.E.E., has been appointed rolling stock superintendent of the Plymouth Corporation Tramways, and took over his duties on April 3. Since he was demobilised Mr. Blackburn has been attached to the staff of the Metropolitan-Vickers Electrical Company, Limited, Trafford Park, Manchester. He is the only son of Mr. A. A. Blackburn, M.I.E.E., M.I.Mech.E., general manager and engineer of the Huddersfield Corporation Tramways, and formerly chief engineer of the Belfast City Tramways.

Mr. Ernest Hatton.—Newcastle City Council on March 29 received a letter from Mr. Ernest Hatton (general manager and engineer of the tramways) referring to his resignation, tendered in a letter dated February 7. Mr. Hatton said he had received further medical advice, and had been given a more favourable report. After the short rest he was feeling somewhat better, and he therefore desired to be allowed to withdraw his resignation. On the motion of Alderman Sir Johnstone Wallace, Mr. Hatton's letter was referred to the Tramways Committee, who unanimously accepted the withdrawal of the resignation.

Mr. John C. Mitchell, F.C.I.S., who has been appointed a Justice of the Peace, joined the old London Road Car Company in his early youth, and ultimately was appointed secretary in 1905. On the amalgamation of the London omnibus companies in 1908 he was appointed secretary of the London General Omnibus Company. Later he became treasurer of the Underground Electric Railways Company of London, and its associated companies. He is a Fellow of the Chartered Institute of Secretaries, and has been president of the Institute. In 1912 he became a member of the Lambeth Borough Council, and for some years has represented that Council on the Metropolitan Water Board. During the war Mr. Mitchell was largely instrumental in organising local volunteers, and he has been president of the Norwood and Streatham Rifle Club. He is vice-president of the London Association for the Blind, and governor of the Belgrave Hospital.

Mr. Charles W. Matthews, the newly-elected chairman of the Highways Committee of the London County Council, although elected to the Council only three years ago for South-west St. Pancras, has had much experience of municipal work in that borough. He has been associated with the Borough Council for 20 years, is an alderman, and has held office as mayor. He has served as chairman of the local Building Committee, and for many years represented the Borough Council on the Metropolitan Water Board. Mr. Matthews has also given his assistance in several other forms of municipal activity. In conversation with a representative of THE TRAMWAY AND RAILWAY WORLD, Mr. Matthews, while declining to express any opinion on London tramway matters (which, of course, come under the purview of the Highways Committee), said he should endeavour to provide the public with the best possible service compatible with economic working. He believed that the transport facilities of London need to be greatly improved, and he is hopeful of seeing this accomplished in the near future. This will come, he thought, with the revival of trade and easier money.

L.C.C. TRAMWAYS—NEW COMMITTEES.

At the meeting of the County Council on March 21 the following were appointed members of the Highways Committee—

Charles W. Matthews (*Chairman*)	E. H. Kemp	Capt. G. E Pierrepont
D. Davies	Lt.-Col. A. C. H. Kennard (*Vice-chairman*)	F. W. Raffety
F. Bertram Galer	Samuel March	Angus N. Scott
T. C E. Goff	W. J. Morton	W. J. Webb
The Earl of Haddo	John Osborn	Capt. O. Wakeman
G. H. Hume	Miss Rachel M. Parsons	Henry Ward

The Stores and Contracts Committee will consist of the following 13 members—

Lt.-Col. Eric Ball	D. Davies	W. J. Pincombe
Sir John Benn, Bart.	Frank Holmes	Sir Lulham Pound, Bart.
J. G. Butler	William Hunt	Percival H. Reed
David Cawdron	W. C. Johnson	Major Isidore Salmon
Edward Cruse		

The London Electricity Supply Committee will consist of the following 14 members—

Ernest M. Dence	The Lord Monk-Bretton	Major Isidore Salmon
Percy A. Harris	Herbert Morrison	Ernest Sanger
G. H. Hume	O. W. Nicholson	Henry Ward
Sir Cyril Jackson	R. C. Norman	W. J. Webb
Henry Mills	Miss Rachel M. Parsons	

The Committee of Selection reported that they did not propose that the Special Committee of Inquiry on Tramways should be re-appointed.

BUSINESS NOTICES.

THE BRITISH THOMSON-HOUSTON COMPANY, LIMITED, have removed their London offices from 83 Cannon Street, to Crown House, Aldwych, W.C.2. Telephone, Regent 8040.

THE DAIMLER COMPANY, LIMITED, have notified the members of the Motor Trade Association that they have altered the price of their 2-3 ton commercial vehicle chassis from £750 to £700. The change is made on all vehicles sold from March 20 until further notice.

TRACKLESS CARS.—A new company was registered on February 21, with a nominal capital of £10,000. The company adopts an agreement with G. A. Bishop and R. A. Chadwick, and will manufacture and deal with electric trackless and railless cars. The address is Hepworth Chambers, 148 Briggate, Leeds.

THE PREMIER ELECTRIC WELDING COMPANY, LIMITED, with the object of increasing the efficiency of its organisation, proposes to concentrate a number of its departments in the London area. Arrangements are being made to transfer the head office, technical and research laboratories and electrode factory to Abbey Wood. All communications should now be addressed to the Premier Electric Welding Company, Limited, Abbey Wood, London, S.E.2.

HOLLINGS AND GUEST'S horizontal 4-throw chain-driven pump has been selected by the Baroda State Railways for working hydraulic presses in the Baroda workshops. Messrs. Hollings and Guest are also supplying a large hydraulic accumulator to work in conjunction with this plant. They are also supplying a hydraulic briquetting press to the East Indian Railways. We are informed that many other British and foreign railway companies have installed presses of Hollings and Guest's manufacture for various purposes, such as solid tyre fitting, wheel forcing, scrap metal bundling, forging, etc. The manufacturers are producing this class of machinery on a large scale.

BERNA LORRIES.—La Fabrique d'Automobiles Berna S.A., of Olten, Switzerland, have announced that by assignment dated December 31, 1921, they have acquired from British Berna Motor Lorries, Limited, and from Berna Lorries, Limited, all rights of manufacture and sale throughout the entire world, and that La Fabrique d'Automobiles Berna S.A. are now alone in a position to manufacture, sell and deal in "Berna" products. Spare part stocks have been replenished, and almost any order can be executed on receipt. The temporary premises of the London depot are situated at 25 Short Street, New Cut, S.E.1. The Swiss Company will appoint agencies all over the country, and a good business opening is available for firms specialising in commercial vehicles of high-class quality.

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PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given in italics.

APPLICATIONS FOR LETTERS PATENT.

The number of the patent is given in brackets.

Seats of tramcars, etc. (7,224)—N. J. Ashton.
Change-speed mechanism for motor vehicles (7,235)—C. G. Atha.
Hub brakes for motor vehicles (6,738)—W. G. Bryan.
Current collecting apparatus for electric tramways (7,105, 7,106, and 7,107)—A. A. Bull and C. W. Kay.
Steering gear for mechanically propelled vehicles (7,169)—H. W. Egerton and Marles Steering Company, Limited.
Electric contact makers for steering wheels of motor vehicles (6,713) —Eurul Patents, Limited, and H. J. Waller.
Tyres for motor vehicles (6,927)—J. V. Eurich.
Variable gears for motor vehicles (6,638)—J. C. Harris.
Electrically propelled vehicles (6,821)—L. B. Hewitt and Metropolitan Electric Tramways, Limited.
Lifting jacks (6,686)—W. Heyden.
Motor vehicles (7,030)—W. E. M. Woan.
Driving gear for motor vehicles (7,529)—L. Anderton.
Electrically propelled motor vehicles (7,814)—C. J. Gordon.
Life guard for motor vehicles (7,305)—H. H. Hancock.
Motor vehicles (7,928)—H. Hudson.
Driving gear of motor vehicles (7,628)—O. Y. Imray (*International Motor Company*).
Steering gear for motor vehicles (7,757)—A. H. Leah and H. Mobbs.
Collapsible covers for lorries, chars-a-bancs, etc. (7,636)—F. T. Murdoch.
Life guards and brakes for motor vehicles (7,575)—J. G. Navarro.
Brake adjusting mechanism for motor vehicle wheels (8,631)—Aéroplanes H. and M. Farman.
Method of jointing rails (8,514)—J. Armstrong and J. H. C. Brooking.
Variable speed gearing (8,156)—E. Austin.
Wheels for motor vehicles (8,024)—F. W. Baker.
Control of electrically propelled vehicles (8,247)—British Thomson-Houston Company, Limited, and H. C. Hastings.
System for operating permanent way points (8,564)—J. W. Christison.
Power propulsion of road vehicles (8,012)—W. H. Dunkley.
Rims of wheels for motor vehicles (8,131)—Dunlop Rubber Company, Limited, and W. H. Paull.
Solid rubber motor vehicle tyres (8,145)—H. W. Ingram.
Automatic life-saving fenders for automobiles (8,084)—E. S. Jones.
Motor vehicle brakes (8,234)—Lanchester Motor Company, Limited, and G. H. Lanchester.
Turnstiles for registering and checking passengers (8,573)—London Electric Railway Company and J. P. Thomas.
Rail joint chairs (8,430)—J. J. Markovich.
Front wheel brakes for motor vehicles (7,996)—G. E. Raybould and G. Whitford.
Electric signalling systems for railways (8,710)—Westinghouse Brake and Saxby Signal Company, Limited (*Union Switch and Signal Company*).
Traction devices (8,931)—A. E. White (*Athey Tractor Company*).
Combination clutch and variable gear for motor vehicles (9,172)—F. E. Baron.
Rail dressing machines (9,140)—T. Brooks and the Woods-Gilbert Rail Remodelling Company, Limited.
Means for controlling water circulation in internal combustion engines of motor vehicles (9,096)—G. Campbell and K. S. Molyneux-ffennell.

SPECIFICATIONS PUBLISHED

1920

Adjusting mechanisms for brake rods of tramway vehicles (22,757—*149,678*)—A. Chaumont).
Tramway sleepers (28,451—*174,989*)—R. Baker.
Apparatus for operating the points of tramways (31,477—*175,048*)—H. A. Thomson.
Tramway vehicles (17,389—*175,302*)—P. Kavanagh.
Pit tubs tramway vehicles (28,631—*175,337*)—G. Milnes and E. R. Milnes.
Brakes for motor road vehicles (32,194—*175,400*)—D. Napier and Son, Limited, and A. J. Rowledge.
Brakes for motor road vehicles (34,000—*175,458*)—W. H. Scott and R. H. Davis.
Motor road omnibuses (29,271—*175,684*)—R. S. Pilcher.
Ticket or fare boxes having fare registering means connected therewith (29,409—*175,685*)—Johnson Fare Box Company and A. J. Tanner.
Automatic couplings for tramway vehicles (34,254—*175,799*)—A. L. McColl.
Automatic locking devices for manually operated brakes used on tramway vehicles (35,093—*175,823*)—S. Thomas.
Lifting jacks (35,428—*175,833*)—Metall-Industrie und Handels-Ges. and F. Ilsemann.
Emergency brakes for rail track vehicles (29,676—*176,041*)—W. F. Rafferty and F. M. Haines.

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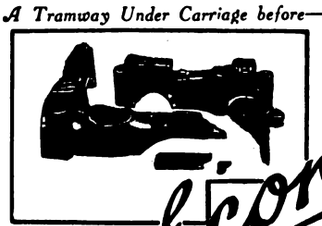
Hand Operated Double-Bladed Rail Cutter *(McMurdo's Patent)*
WILL CUT THROUGH A 7 in. × 7 in. TRAMWAY RAIL IN 20 MINUTES
The machine is fitted with two 14 in. × 1 in. hacksaw blades which cut simultaneously into the rail, thereby practically halving the cutting time. It is hand operated by one man and is portable. The machine holds the rail and not the rail the machine.
Railway Supplies Co. Limited,
68 Victoria Street, Westminster, S.W.1.

A Tramway Under Carriage before—

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Liquid fuel supply for motor vehicles (33,486—*176,105*)—Guy Motors, Limited, and E. J. D. Buckney.

1921

Apparatus for holding fishplates in position when welding tramway rail joints (11,387—*175,216*)—G. Wallace and H. Bolton.
Lifting jacks (2,289—*175,514*)—J. Tatton.
Insulators for conductor rails (2,307—*175,515*)—W. H. Meyrick.

FOR SALE.

POWER STATION AND EQUIPMENT.

The Corporations of Middlesbrough, Thornaby-on-Tees and Stockton-on-Tees having taken over the undertaking of the Imperial Tramways Company, Limited, in the three boroughs, have for sale portions of the land, buildings, machinery and plant which are not required by the Corporations in connection with the running of the tramway undertaking subsequent to the transfer.

The particulars are as follows—

(1) Buildings utilised by the Imperial Tramway Company for the purpose of generating electricity, and consisting of—

Power House, measuring or containing 335,610 cubic feet.
Boiler House, containing 193,031 cubic feet.
Offices containing 21,546 cubic feet.
Smoke Stack of best pressed bricks and lined with fire bricks.
All necessary foundations for the machinery.
A Wharf, 200 ft. long, abutting on the River Tees, constructed of pitch pine timber and red deal, with 336 sq. yds. of slag pitching.
Boundary Walls, together with freehold land upon which the buildings are erected and adjacent and incident thereto, containing 426 sq. yds. or thereabouts.

The buildings are built of best pressed brick, the Power House being lined with glazed bricks.

The Power Station is equipped with 3 Corliss Horizontal Compound Condensing Engines, direct-coupled to 3-phase, 25-cycle, 2,500 volt Generators, 2 Rotary Converters, 25-cycle, wound to give 500 to 550 volts on D.C. side, Rotary Converter Booster, Switchboard, Overhead Travelling Crane, Motor-driven Centrifugal Circulating Pump, 3 Babcock and Wilcox Boilers, evaporation 12,000 lbs., with Vickers' Mechanical Stokers, Electric Motor for driving Mechanical Stokers, Green's Economiser, Coal Bunkers, Coal Elevator (fitted with Avery's Automatic Weigher), Electric Grab Crane, Cables, Piping, Electric Lighting Equipment, and other forms of plant and machinery necessary for a fully-equipped Electricity Generating Station.

The whole of the above are situate and adjacent to Bridge Road, Stockton-on-Tees, and abut upon the River Tees a little to the west of the Victoria Bridge, which crosses the Tees at or near to that point.

The buildings, which were erected about 22 years ago, are built in a most substantial manner, and are in good order and condition.

The plant has likewise been kept in first-class running order.

In addition to the above, there is also for sale—

(2) Plant and Machinery in the Newport Sub-station situate in Newport Road, in the Borough of Middlesbrough, consisting of—

Three Rotary Converters, Single-phase Air-cooled Transformers, Centrifugal Fans, Electric Motors, Switchboard, 13 Panels, and all necessary Cables.

(3) Also the following plant now at Bridge Road premises, Stockton-on-Tees—

Weighbridge, Hydraulic Lifting Jack, Axle Tester, Hydraulic Rail Bender, Hydraulic Punching Bar, Wells' Light, Snow Sweeper, Hand Ambulance.

Tenders are invited for the purchase of—

(1) The Land, Buildings, Machinery, and Plant as described above, situate in or near to Bridge Road, Stockton-on-Tees.
(2) The Plant and Machinery at the Newport Sub-station.
(3) The Miscellaneous Plant, or, alternatively, tenders under the head of 1, 2, and/or 3 separately or any two of them.

Particulars and Conditions of Sale and permission to view can be obtained from the undersigned, to either of whom sealed Tenders must be sent not later than May 30, 1922.

Please mark envelopes "Tenders for Tramway Premises or Plant."

The Corporations give no undertaking to accept either the highest or any other tender or tenders that may be sent in.

PRESTON KITCHEN,
Town Clerk and Clerk to the Tramways Committee,
Municipal Buildings, Middlesbrough.

THOS. DOWNEY,
Town Clerk and Clerk to the Stockton and Thornaby Joint Tramways Committee, Borough Hall, Stockton-on-Tees.

April 6, 1922.

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TRAFFIC RETURNS.

Tramway and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1921. WEEKS ENDED					1922. WEEKS ENDED					AGGREGATE.		
	Mar. 12	Mar. 19	Mar. 26	April 2		Mar. 11	Mar. 18	Mar. 25	April 1		Wks.	1921-22.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	3,289	3,377	3,468	3,481	...	3,294	3,272	3,132	3,154	...	43	152,456	− 13,059
Aberdeen Motor Buses	52	54	57	63	...	128	143	132	143	...	43	9,860	+ 8,435
Ayr Corporation	548	549	578	665	...	485	496	470	461	...	46	31,912	− 2,622
Barrow Corporation	879	884	947	943	...	598	607	584	580	...	52	41,923	− 5,097
Belfast City Tramways	12,006	12,519	12,515	12,551	...	11,745	11,770	11,317	11,565	...	52	647,618	+ 48,333
Birkenhead Corporation	2,590	2,619	2,511	2,771	...	2,550	2,485	2,411	2,512	...	—	710	− 419
Birkenhead Motor 'Buses	390	408	519	595	...	543	560	515	553	...	—	195	− 70
Birmingham Corporation	31,546	31,407	30,410	32,156	...	29,209	28,524	27,691	27,858	...	52	1,512,000	− 133,544
Birmingham Motor 'Buses	1,860	1,866	1,932	2,324	...	2,022	1,706	1,589	1,613	...	52	100,998	− 3,192
Blackburn Corporation	2,419	2,362	2,414	3,711	...	2,264	2,206	2,135	2,173	...	52	116,123	− 11,411
Bradford Corporation	13,944	14,465	14,152	16,364	...	13,532	13,777	13,758	13,286	...	½	3,028	− 2,329
Burnley Corporation	3,531	3,316	4,184	3,666	...	3,178	3,246	3,237	3,099	...	—	—	—
Burton-on-Trent Corporation ...	611	654	676	681	...	585	555	550	547	...	52	32,079	+ 42
Bury Corporation	2,527	2,373	2,961	1,427	...	2,465	2,343	2,235	1,457	...	52	125,401	− 6,312
Chatham and District	1,593	1,619	1,716	1,994	...	1,490	1,563	1,407	1,498	...	13	18,565	− 2,517
Chesterfield Corporation	642	640	630	711	...	579	551	528	529	...	52	30,204	− 1,181
Chesterfield Motor Buses	868	858	834	1,018	...	728	681	669	665	...	52	38,965	− 3,525
Derby Corporation	2,220	2,301	2,547	2,609	...	2,098	2,025	1,933	1,960	...	52	110,918	− 8,662
Dundee City	3,004	3,076	3,047	3,251	...	2,926	2,891	2,809	2,808	...	45½	143,600	+ 4,006
East Ham Corporation	2,139	2,197	2,308	2,253	...	2,191	2,159	2,055	2,130	...	52	110,294	+ 1,692
Edinburgh Corporation	...	...	...	...	...	11,145	11,232	11,134	11,147	...	46	572,704	− 40 212
Edinburgh Motor 'Buses	...	...	...	...	...	3,202	3,204	3,143	3,185	...	46	161,530	—
Glasgow Corporation	46,399	46,048	46,458	44,260	...	44,280	45,126	43,326	45,233	...	43½	1,964,160	− 3,362
Glossop (Urban Elec. Supply Co.)...	218	227	290	248	...	233	233	206	217	...	13	2,953	− 137
Halifax Corporation	4,133	4,327	4,210	5,582	...	3,890	3,896	3,819	3,825	...	50½	219,641	− 3,200
Halifax Motor 'Buses	111	113	110	150	...	64	57	58	68	...	50½	3,913	− 1,917
Halifax Railless Cars	...	...	...	...	...	48	53	48	35	...	36	1,871	—
Huddersfield Corporation	5,307	5,300	5,520	6,665	...	4,833	4,940	4,874	4,939	...	1	4,939	− 1,725
Ilford U.D. Council	1,389	1,427	1,446	1,482	...	1,470	1,430	1,387	1,434	...	52	77,687	+ 9,814
Ipswich Corporation	824	848	962	977	...	747	737	680	707	...	52	43,900	− 5,846
Isle of Thanet...	545	572	579	1,367	...	529	589	525	553	...	25½	15,413	+ 230
Kilmarnock Corporation	353	365	374	...	...	320	317	304	...	...	44½	15,914	− 685
Leicester Corporation	6,331	6,474	6,553	7,547	...	7,146	7,191	7,001	7,105	...	13	92,673	+ 7,452
Liverpool Corporation	29,506	32,568	29,649	30,854	...	28,962	29,260	29,559	28,679	...	13	373,842	+ 5,127
London County Council	99,942	101,551	102,314	102,940	...	92,928	93,726	90,820	90,509	...	52	5,045,561	+ 157,986
Maidstone Corporation	412	420	446	525	...	397	402	380	441	...	52	24,118	− 755
Manchester Corporation	37,884	37,333	38,985	31,335	...	37,232	37,734	35,864	29,436	...	52	1,998,403	+ 174,752
Newcastle-on-Tyne Corporation ...	11,335	11,357	11,665	...	...	Strike	Strike	8,245	...	...	51	534,737	− 32,934
Nottingham Corporation	7,348	7,574	8,215	8,479	...	7,663	7,424	7,371	8,774	...	52	361,139	− 41,227
Oldham Corporation	4,592	4,531	5,040	5,046	...	4,689	4,534	4,447	4,378	...	1	5,895	− 1,643
Preston Corporation	1,865	2,003	1,856	2,338	...	1,832	1,740	1,692	2,165	...	52	98,562	+ 2,637
Preston Motor 'Buses	...	...	...	...	...	135	127	124	159	...	9½	1,268	—
Reading Corporation	1,512	1,562	1,663	1,752	...	1,529	1,502	1,415	1,445	...	52	81,525	− 4,350
Reading Motor 'Buses	246	270	296	387	...	317	302	286	278	...	52	17 361	+ 3,481
Rotherham Corporation	2,622	2,675	2,625	2,830	...	2,274	2,209	2,133	2,152	...	51	115,064	− 21,620
St. Helens Corporation	2,078	2,125	2,016	2,405	...	1,627	1,597	1,524	1,515	...	52	91,333	− 17,356
Salford Tramways	10,645	10,332	10,821	12,046	...	10,378	10,362	9,891	10,088	...	1	10,088	− 1,958
Sheffield Corporation...	20,062	20,411	20,269	22,111	...	18,568	18,241	17,959	17,884	...	52	1,003,402	− 80,739
Southampton Corporation	2,934	2,964	3,056	3,474	...	2,883	2,893	2,820	2,849	...	52	153,161	− 10,084
Southampton Motor 'Buses	176	180	180	179	...	101	97	94	98	...	52	7,581	− 4,747
Southend Corporation	1,646	1,730	1,733	2,904	...	1,941	1,964	1,930	1,938	...	52½	126,014	+ 7,750
South Shields Corporation	1,883	1,897	2,033	1,391	...	1,690	1,680	1,608	1,267	...	52	88,183	− 12,704
Sunderland Corporation	2,730	2,864	2,902	1,845	...	2,497	2,401	2,456	1,734	...	52	134,544	− 22,643
Swindon Corporation	355	368	370	463	...	337	325	318	323	...	51½	19,948	− 127
Tyneside Tramways and Tramroads	1,096	1,157	1,170	2,386	...	697	688	702	820	...	13	9 916	− 5,839
Wallasey Corporation	2,588	2,619	2,600	2,978	...	2,527	2,390	2,298	2,333	...	52	142,761	+ 6,300
Wallasey Motor 'Buses	141	150	152	238	...	211	189	200	191	...	52	12,118	+ 3.285
Walsall Corporation	1,825	1,885	1,924	1,645	...	1,654	1,632	1,571	1,252	...	52	85,116	− 9,976
Walsall Motor 'Buses	1,231	1,240	1,350	1,200	...	954	917	906	629	...	52	48,470	− 13,753
Walthamstow U.D. Council	1,889	1,933	2,158	2,256	...	1,789	1,838	1,680	1,724	...	52	103,703	− 2,109
Warrington Corporation	1.060	1,071	1,088	1,084	...	1,038	987	963	1,024	...	52	51,945	− 786
West Ham Corporation	6,081	6,143	6,266	6,649	...	5.621	5,679	5,459	5,428	...	52	304,762	− 730
Wolverhampton Corporation ...	2,218	2,274	2,621	1,993	...	2,318	2,159	2,178	1,657	...	52	120,624	− 4.719
Wolverhampton Motor 'Buses ...	630	603	852	546	...	649	627	634	506	...	52	33,936	+ 8,769

Underground Electric Railways Company of London, Limited.

NAME OF COMPANY.	1921. WEEKS ENDED					1922. WEEKS ENDED					AGGREGATE.		
	Mar. 12	Mar. 19	Mar. 26	April 2		Mar. 11	Mar. 18	Mar. 25	April 1		Wks.	1922.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	
Underground Rlys. & L.G.O. Co. ...	225,485	227,665	227,360	241,706	...	218,814	220,159	210,322	213,069	...	13	2,742 088	− 229,889
London and Suburban Traction ...	50,292	50,617	53,343	57,377	...	48,900	49,051	45,562	46,092	...	13	596,548	− 58,700

Colonial and Foreign Tramway Traffic Returns.

Companies issuing Weekly Returns.

NAME OF COMPANY.	1921. WEEKS ENDED					1922. WEEKS ENDED					AGGREGATE.		
	Mar. 12	Mar. 19	Mar. 26	April 2		Mar. 11	Mar. 18	Mar. 25	April 1		Wks.	1922.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	82,703	84,018	72,461	79,540	...	88,613	83,869	86,730	85,049	...	13	1,082,674	+ 47.482
Calcutta ... ... Rs.	81,297	83,051	78,740	79,537	...	111,612	101.866	106,616	109,676	...	13	1,372,411	+ 564,936
Madras... ... ... Rs.	(2 weeks)	41,016	(2 weeks)	56,919	...	(2 weeks)	49,857	(2 weeks)	47,773	...	13	291,232	+ 145.588
Pernambuco	4,757	4,219	3,763	3,929	...	3,746	3,670	3,624	3,340	...	13	48,917	− 12,308

Companies issuing Monthly Statements only.

	1920.		1921.				1921.			1922.			Wks.	AGGREGATE.	
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.		1921-22.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo	4,442	4,810	4,601	5,342	4,594	...	4,682	5,137	4,762	5.565	4,805	...	44	50,657	+ 3,120
Brazilian Trac. Mlrs	1,344200	12199000	12600,000	12875000	11941000	...	15016000	14555000	15405000	15032000	14473000	...	8	29,505.000	+ 4,689,000
Brisbane	46,310	...	...	46,280	43,205	46,300	47,880	...	...	48,790	43 800	51,300	13	143,890	+ 8,105
British Columbia $	835,054	858.842	917,668	908,385	838,682	...	845,973	877,335	940,113	907.242	821,828	...	34	6.921,985	+ 157,547
Buenos Ayres L'c'z	57,619	56.746	68,857	61,111	53,952	59,365	58,492	58,056	63,381	61,198	55.227	61,775	39	521,819	+ 11,105
Burma	55,763	53.696	50,481	50,035	48,405	...	64,778	58,271	54,194	59,362	52,380	...	30	403,127	+ 45,959
Cape Town ...	...	25.628	29,768	...	...	...	26,839	27,004	31,521	30,289	26,980	...	—	—	—
Carthagena & H. ...	3,319	2,714	5,560	3,877	2,839	2,226	3,862	1,717	3.237	3,075	2,773	2,145	13	7,993	− 949
Cordoba	19,627	19,122	19,299	18.696	...	...	23,203	22,698	22,641	22,152	...	...	43	230,068	+ 32,934
East India ...	4,299	4.234	4,271	4,299	3,819	4,168	4,054	3,945	4,058	4,080	3,737	4,446	34	33,017	− 410
Kalgoorlie... ...	3,094	2,969	3,140	...	...	...	2,406	2,419	2,814	...	...	...	52	27,758	− 9,054
La Plata	6,310	5,573	...	6,506	*728	*3,403	6,587	6,453	...	6,724	6,318	7,067	13	20,109	+ 9.471
Manila ... $	327,652	320,345	315,599	321,449	306,389	...	323,108	306,850	316,467	309,252	310,001	...	8	619,253	− 8.585
Monte Video ...	45,246	43,846	...	50,863	48,119	48,925	47,927	47.426	...	32,634	48,111	51.158	21	231,459	− 9.229
Para	26,772	24,273	24,253	24,231	20,545	...	25,548	23,147	22,660	22,966	21,582	...	13	67,208	− 1,821
Port Elizabeth ...	...	6,620	8,185	...	...	...	6,788	6,828	8,344	8,120	6,690	...	—	—	—
Rangoon ... Rs.	111,830	104,468	120,000	122,588	120,718	...	151,000	137,750	145,500	137,850	130,583	...	8	268,433	+ 25,157
Winnipeg ... $	444,899	477,957	...	506,229	460,125	...	441,315	477,880	...	507,047	498,577	...	8	1,005,624	+ 39,270

* Strike of Employees.

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United Automobile Services, Ltd.,
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Dear Sirs, 16.11.1921.

"I am rather pleased at the record made by your Chassis No. 15363, which was placed in service by us on 1st July, 1920, and which is now about to come in for overhaul.

This chassis has now covered a total of 60,500 miles without coming in for heavy repairs."

Yours faithfully,
(Sgd.) E. B. HUTCHINSON,
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BUILDERS OF LONDON'S BUSES

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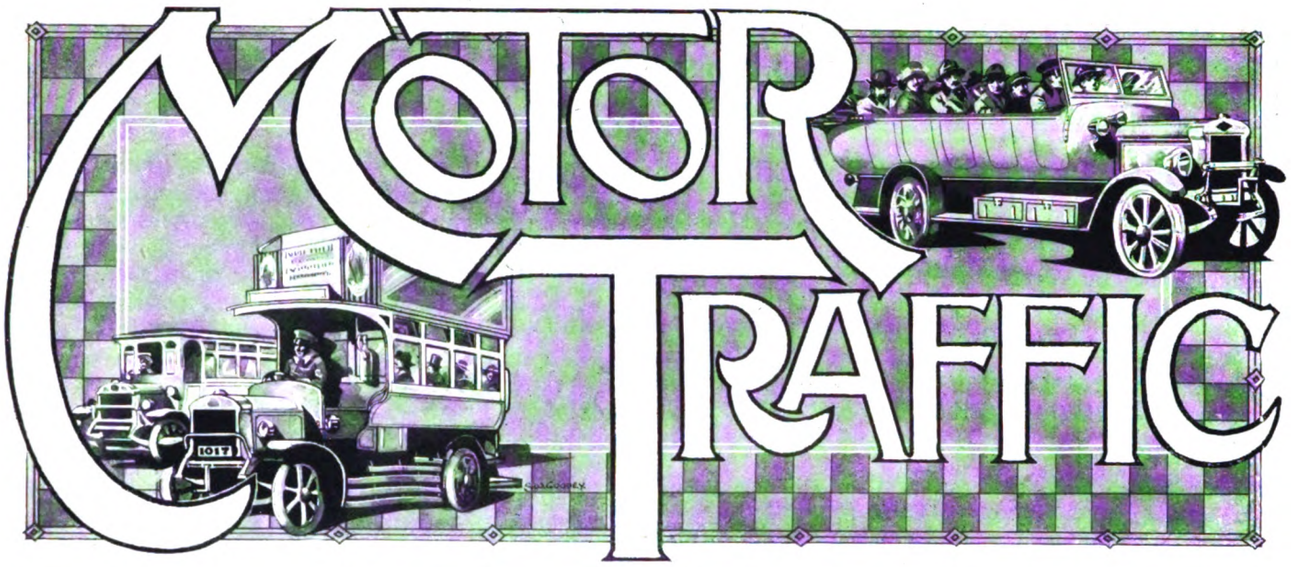

MOTOR TRAFFIC SECTION—SEVENTEENTH YEAR OF PUBLICATION.

THE SEATING OF MOTOR COACHES.

As regards the arrangement of seating accommodation the motor coach exists in a great number of varieties. The general tendency in the future will probably be towards the employment of rather smaller vehicles, but, unless the largest types are rendered useless in many districts by the arbitrary closing of roads against them, these will still continue to be employed in considerable numbers wherever the main problem is to provide accommodation at a low cost per head. In the popular type of coach, every inch of space must be utilised, even if certain inconveniencies are thereby caused. Thus, for instance, the arrangement of seats on either side of a central gangway, with a single entrance at the rear, means some loss of space which might be devoted to the carriage of a paying load. On the other hand, continuous transverse seats with side doors are inconvenient if passengers are taken up and set down singly, or if particular seats are allocated in advance. In such cases, considerable disturbance is caused to a number of other passengers when one passenger wishes to get in or out. This disturbance could be reduced by putting side doors at each end of each seat, but this plan is not generally recommended, because it weakens the whole structure of the body. In some cases, in which the central gangway method is employed, folding seats are provided which block the gangway when the vehicle is full. These folding seats are generally inferior in the matter of comfort, and the blocking of the gangway by them causes confusion when the vehicle is loading and unloading, especially when passengers are to be set down individually. In the higher class coaches, double bucket seats on either side of a central gangway are sometimes provided, or we may go a step further and provide single bucket seats, slightly staggered in position so as to give more elbow room. The coach de luxe in which the problem is to provide the maximum of comfort, more or less regardless of economy, is a totally different proposition. In some districts and for some purposes it may be the most paying type, but to the majority of holiday makers, the cost of accommodation is prohibitive. One further point may be mentioned as being allied to the subject of this note. This is the provision of facilities for passengers entering or leaving the vehicle. The floor is some distance above the pavement and two steps are generally necessary. Some arrangement ought therefore to be adopted by means of which the lower step can be made to project further outward than the upper step. In that case the lower step must generally be hinged, so that when the passengers are in the vehicle it can be folded inwards and does not constitute a dangerous projection.

SPECIAL MOTOR ROADS.

More than one project is now on foot for the construction of motor roads to link up important industrial centres in Great Britain. Projects in some respects similar were mooted many years ago, but in those days the main idea was to provide a track for fast private car traffic. Now the idea is rather to improve the facilities for the cheap operation of industrial vehicles. Whether any of these schemes will mature or not, it is difficult to say. One doubtful factor is the reception they will get in Parliament. Another is the question of whether the tolls received for the use of the roads could possibly be sufficient to pay fair interest on the capital invested after meeting maintenance and management charges. Undoubtedly, motor traffic, even under present conditions, is a dangerous competitor of railway traffic over all moderately short distances. If the conditions are improved by providing really suitable smooth, wide and graded roads, the length of haul over which the motor will have the advantage of the railway will be much increased, and this may still be true after a substantial toll has been paid by the motor for the use of the special road. This special road would, no doubt, be linked up in some way to existing roads, so that we should go rather near to combining the advantages of the two systems; namely, the speed possibilities of the railway over direct long distance journeys, and the elimination of intermediate loading details, which is so great an advantage of motor traffic. All such schemes are, however, as yet on paper, and none of them can be regarded as an immediate possibility.

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MOTOR TRAFFIC

THE LAW AND THE TRAILER.

Though the new regulations which are to take the place of the old Heavy Motor Car Order have not yet been approved by Parliament, the nature of the recommendations to be made by the Committee of the Ministry of Transport and, presumably, by the Ministry itself to Parliament, is now fairly generally known. It is apparent that the Committee now realises the importance of improving the economy of transport by encouraging the wider use of trailers under more favourable conditions.

The first difficulty is to define what a trailer is. The suggested definition is that a trailer is "any vehicle drawn by a mechanically-propelled vehicle, other than a sidecar attached to a motor bicycle." This definition is imperfect. For one thing it does not clear up the position as regards the after portion of a flexible six-wheeled vehicle. Is this after portion a trailer, or is it a part of the vehicle itself? It can be detached from the power-driven portion and has considerable power of independent movement, and might quite conceivably be regarded as coming within the above definition of a trailer. In that case, a flexible six-wheeler would be subject to the same disabilities as the trailer combination as regards speed limits, and its development would be impeded if not stopped altogether. Another doubtful case is that of a vehicle carrying no power plant of its own; but designed to run behind a power-driven vehicle and provided with means of positive propulsion of two or more of its wheels. Thus, for instance, the following vehicle might be fitted with electric motors supplied with current from a dynamo driven by the engine of the power vehicle. In that case, the following vehicle is not, strictly speaking, drawn in the ordinary sense of the word, and one is left wondering whether it would be classified as a trailer or not.

The recent increase in legal unladen weights of power vehicles is one of the necessary preliminaries towards the extended use of a trailer. So long, however, as the limits of laden weight is put at 12 tons, the petrol vehicle manufacturer is in something of a dilemma. If he produces a power vehicle weighing 7¼ tons unladen, he has a margin of only 4¾ tons for useful load. The vehicle should be capable of carrying considerably more than this, even on hilly roads. The vehicle cannot, therefore, be fully utilised unless it draws a trailer, and this, in the future as in the present, though to a less degree, will mean a reduction in the speed limit.

This difficulty is realised, and it is now proposed that the limit of laden weight should be raised to 14 tons for a self-propelled vehicle of normal design, or to 22 tons for the vehicle and its trailer together. This will probably be coupled with a maximum legal axle weight of 10 tons for the vehicle and 6½ tons for the trailer. Assuming these alterations to be made, the way is open to the construction and use of very substantial petrol vehicles weighing about 7 tons unladen, carrying approximate 7 tons and drawing an additional 4 tons in a trailer, wherever road conditions permit. The very heaviest types of vehicles will probably be limited to a speed of 8 miles an hour, and this speed will apply also to the somewhat lighter types if trailers are drawn. For the heaviest types, therefore, the trailer would be encouraged as definitely increasing the working capacity. In connection with the rather light types, the loss in speed will more or less balance the increase in carrying capacity when the trailer is used. The position will, however, be considerably better than it is now, since, under the present law, the use of a trailer behind a petrol lorry entails a reduction in working capacity if legal restrictions are observed. Special provision will be made for quite light pneumatic-tyred trailers, which will be permitted behind comparatively light pneumatic-tyred vehicles travelling, probably, up to 16 miles an hour without breaking the law.

It is understood that special regulations will be made in the interests of the flexible six-wheeler. It does not appear that these regulations would be necessary if speeds were determined solely on the basis of axle weights. If, however, as is apparently intended, speeds will depend also on unladen weights, a schedule suitable for a four-wheeler will not be suitable for a six-wheeler, which can be given considerably larger unladen weight without excessive axle weights being involved. On the whole, the forthcoming regulations will give improved prospects of economy along three lines, namely, by the more efficient use of trailers of greater capacity and at higher speeds, by the use of flexible six-wheelers under better conditions, and by the use of pneumatic-tyred vehicles at reasonable speeds, calculated to increase their working capacity sufficiently to justify the higher maintenance costs of the pneumatic tyres.

MOTOR COACH SEASON.

LANCASHIRE TRAMWAY COMPANY'S PLANS.

With the opening of the motor coaching season the Lancashire United Tramways, Limited, of Atherton, have lost no time in making known to the public the extensive and well-organised system of coach tours which they conduct. Mr. E. H. Edwardes, the general manager, has just issued the 1922 edition of the company's admirable little guide-book, "Touring by Motor Coach," the price of which, we notice, is now 1s. instead of 1s. 6d. as hitherto. Its one hundred pages contain attractive descriptions and photographs of many of the places of interest visited on the tours and several excellent maps of the ground covered. An indication of the increasing popularity of this form of holiday is afforded by the fact that the company's fleet of coaches has increased from three, which sufficed when the tours were commenced eight years ago, to 70 now in use. With their centre at Atherton, the company are well situated for providing the large surrounding industrial population with facilities for visiting some of the most charming scenery in the country—that of North Wales, the Lakes, and the Pennine Dales, all of which districts lie within one day's "out and home run." Their policy this year will be to offer single-seat bookings for day and half-day outings, week-end tours to Wales, extended tours and trips by the company's special Austin 6-seater landaulettes. The regular services will include a daily run to Blackpool, a bi-weekly service to Llangollen, and a weekly journey to Southport. It is also hoped to establish half-day services on Saturdays, Sundays, and Wednesdays. An equally complete programme will be conducted from the Liverpool depot of the company, whence coaches will run to Chester, Delamere, Llangollen, Ruthin, and the Lancashire coast resorts.

The Welsh week-end and extended tours proved very popular when inaugurated last season. First-class accommodation is reserved for each passenger at selected hotels. The company also intend to run coaches to all the principal sporting events, and their ability to deal with large "works' outings" was typified by their success on one occasion in carrying 1,452 persons in 56 vehicles.

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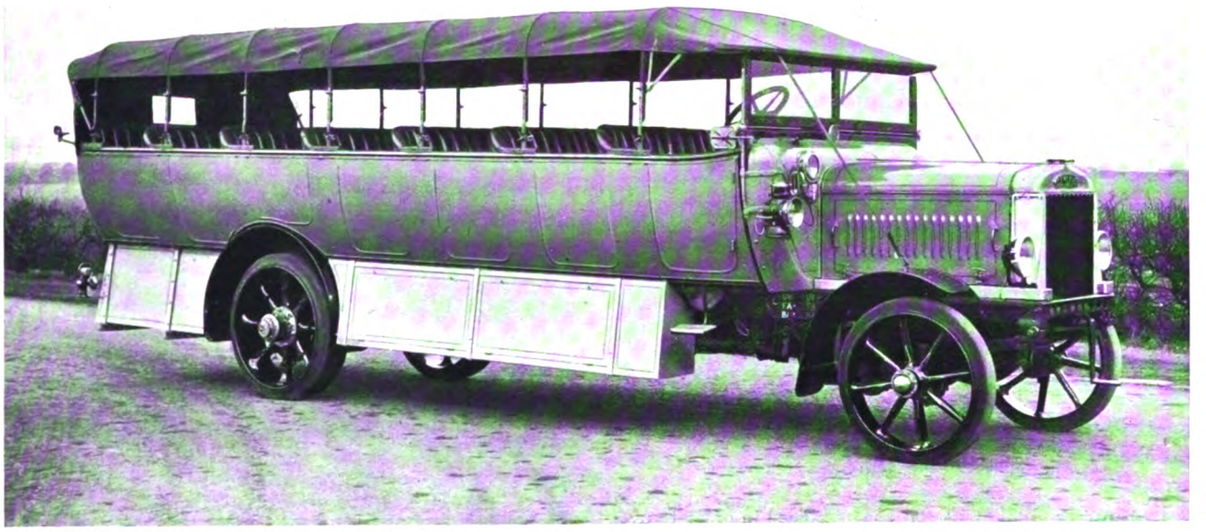
MOTOR TRAFFIC

LEYLAND MOTOR COACH WITH SPECIAL LOCKERS.

It has always been a problem how successfully to arrange for the carriage of passengers' luggage on motor coaches without discomfort to the tourist. One of the latest Leyland coaches just delivered from their works, which is shown in the accompanying illustration, has been equipped with spacious luggage lockers, which are fitted on the off-side of the vehicle and also at the rear. There are various compartments, and each can be locked, thus securing the safety of passengers' luggage. As the extra expense for fitting such lockers is comparatively small, the Leyland Company seem to have hit upon an excellent arrangement.



Leyland Motor Coach showing Luggage Lockers.

WELSH ORDER FOR TILLING-STEVENS.

In March of last year, the Caerphilly Urban Council began operating omnibuses with several single-deck petrol-electric omnibuses supplied by Tilling Stevens Motors, Limited, of Maidstone. The council's experience of these vehicles has proved so satisfactory that another of the same standard type was ordered and has recently been delivered. The single saloon seats 28 people.

Tilling-Stevens Petrol-Electric Omnibus.

NEW ZEALAND'S "COMMER" OMNIBUSES.

The Commercial Car Company have supplied a number of their 3P passenger chassis with 30-seat body to the Palmerston North Borough Council, New Zealand. Fitted with twin pneumatic tyres on the rear wheels and single on the front, the vehicles provide luxurious travelling, the seats being upholstered in dark green and thoroughly sprung. The disc wheels are interchangeable. The entrance is on the side near of the driver. With the exception of one row the seats are arranged to face the entrance, and a gangway runs down the centre. At night the saloon is lighted by electric lamps let into the roof. The 3P passenger chassis has an engine of 40 H.P. with four cylinders. Power is transmitted through the "Commer" gear box, which has four speeds and a reverse, and thence through an intermediate and propeller shaft to the full floating live axle. The body is strikingly finished in brilliant red with silver-plated fittings.

"Commer" Omnibus in New Zealand.

BRIGHTON TROLLEY OMNIBUSES.—The Ministry of Transport has, it is reported, extended the time to August 1923 for the installation of trolley omnibus equipment under the Brighton Corporation Act 1921, and the Order 1917.

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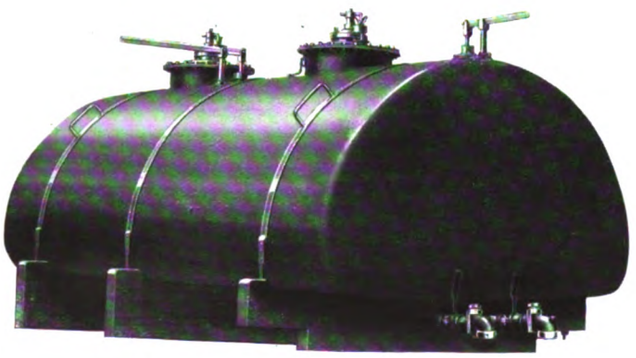
MOTOR TRAFFIC

MAUDSLAY SADDLE TANK WAGON.

The new type of saddle tank wagon illustrated below represents the latest method of transporting motor spirit by road, and has just been introduced by the Maudslay Motor Company, of Coventry. It embodies a number of features which show a marked improvement upon the older type of wagon, and is fitted with an asbestos fireproof screen which conforms to the new regulations governing the transport of motor fuel.

Maudslay Saddle Tank Wagon.

The D-shaped or saddle tank has been designed in order to overcome the disadvantages of the ordinary cylindrical tank. It is made by the Steel Barrel Company, Limited, of Uxbridge, who for many years have enjoyed a high reputation as makers of all types of tanks. The chief disadvantages of the cylindrical tank is the height and high centre of gravity. In the saddle tank the overall height is considerably less, while the low centre of gravity not only permits larger tanks to be safely used, but reduces the strains and stresses set up in the chassis to a minimum, with a consequent lengthening of life both in the chassis and the tyres. The



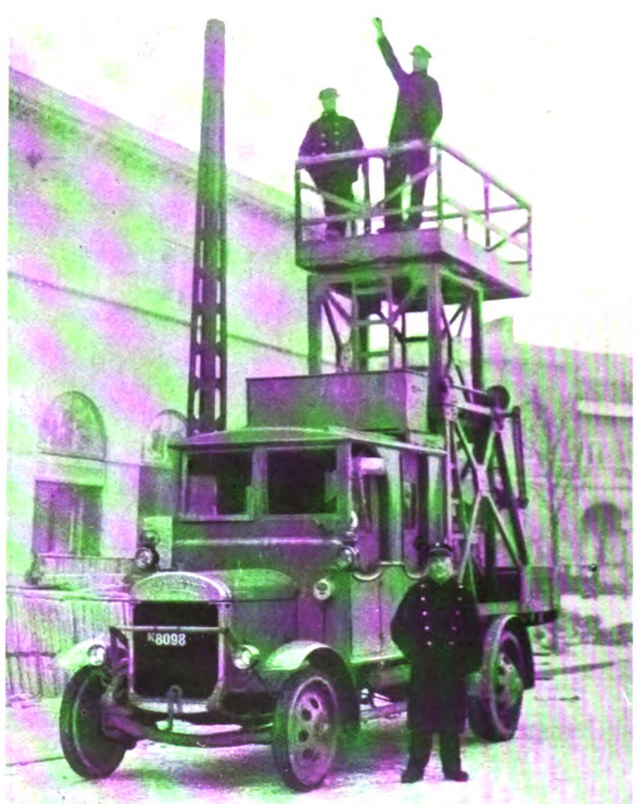
D-Shape Tank with Standard Fittings.

illustration of the unmounted tank shows it complete with standard fittings approved by the London County Council.

The tank wagon shown is one of six 1,000 gallon machines supplied to the proprietors of "Flight" spirit fuel. It is mounted upon the Maudslay 4-ton chassis, of which the following is a brief specification—The side members of the frame are of rolled steel channels built up with tubular cross members and bolted together, no rivets being used. The engine is the Maudslay standard 40-H.P. motor with overhead valves, the cylinders having a bore and stroke of 5 inches. The gear box is of the sliding type, with four speeds and a reverse. The ample proportions of the shafts, together with the short distance between the bearings, is an important feature in its design, and makes for great rigidity. The final drive to the back axle is by means of a double reduction gear, spur and bevel gears being used. The gears, together with the differential, are suitably mounted, and provided with roller journal bearings and ball thrust bearings. The back axle is the well-known Maudslay banjo type, forged solid in nickel chrome steel, which has stood the test of time so well under all conditions of load and road. Ackermann type steering gear is fitted, with strong irreversible worm and segment, all joints being of the cup and ball joint type. The springs are of ample size and length, and are made of the finest spring steel with solid forged eyes. Two powerful brakes are fitted; the hand brake operates on the rear wheels, to which brake drums of large diameter are fitted, the brake anchorage being rigidly mounted on the axle. The foot brake acts upon a drum mounted at the rear of the gear box. The ignition and throttle levers are placed underneath the steering wheel on a quadrant at the side of the steering column, and is not affected by the steering. A foot accelerator is also fitted, which works independently of the hand throttle lever. The overall length of the chassis is 21 ft., giving a free loading space of 12 ft. 4½ in. behind the driver's seat, the wheel base being 13 ft. 6 in.

THORNYCROFT TOWER WAGONS FOR COPENHAGEN.

The photograph reproduced below illustrates one of two tower wagons built on two "J" type chassis supplied to the Copenhagen Tramways through the Scandinavia house of John I. Thornycroft and Company, Limited, at Copenhagen. An interesting feature



Thornycroft Tower Wagon for Copenhagen Tramways.

of the machine is the separate compartment behind the driver's cab for the accommodation of the linesmen. The bodywork was constructed in the tramways workshops.

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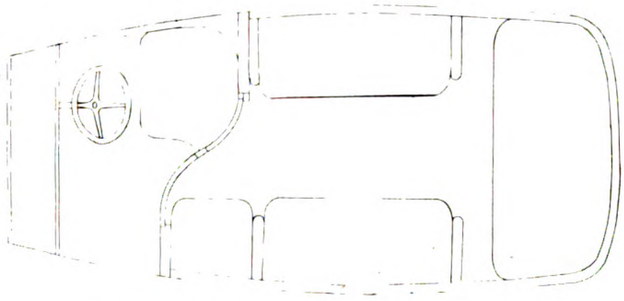
MOTOR TRAFFIC

BRADFORD'S COMMITTEE CAR.

A notable feature of the administrative methods of Bradford Corporation is a "committee car," which is used by various sub-committees and officials to visit parts of the city where municipal work is in progress. The body, which was designed by the tramways staff and made at the tramway works, accommodates eight persons, so that it is possible to conduct an appreciable amount of business during the journeys. The facilities thus provided for intercourse and discussion between members of the committees have naturally resulted in great economy of time and have proved a distinct advantage in every way. We are indebted to Mr. R. H. Wilkinson (general manager of the city tramways) for the following description of the committee car—

Bradford Corporation's Committee Car.

The chassis is a Crossley 25-30 H.P. R.A.F. type and was purchased from the Government Disposal Board. The body for which, as stated, the tramways department was responsible, is of the saloon type, with front entrance. A bucket seat, upholstered in leather, is provided for the driver, and at his near side is a door leading to the interior of the vehicle. The seating accommodation allows a space of 24 in. for each of the eight passengers. The seats are so arranged as to facilitate consultations *en route*. The seat at the back is placed transversely and accommodates three passengers. The floor at the rear of the body is raised 5 in. above the centre and forward part, affording the passengers on this seat a clear view for intercourse with the remaining passengers, and an uninterrupted outlook through the front windows. Two seats, with accommodation



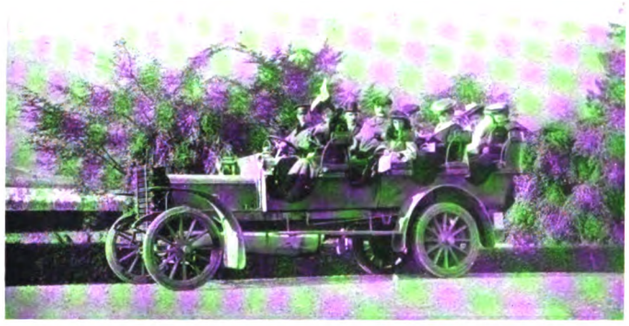
Arrangement of Seats in Bradford Committee Car.

for two passengers each, are arranged one along each side of the vehicle, while on the near side, between the side seat and the entrance, is a tip-up seat for one person. The committee car is equipped with a self-starter and electric lighting set. Speaking tubes provide easy communication with the driver. The constructional details of the body are as follows—

All framework is of teak, and the outside is of beaten steel electrically welded to form one continuous whole. The windows are of plate glass, bevelled edged, framed in mahogany, the outer edges of the frames being fitted with heavy felt linings so that there is practically no noise from the windows while the vehicle is travelling. All the linings of the car are in dark brown Bedford cord, with trimmings to match. The seat cushions are of deep construction and afford very comfortable riding. The exterior of the car is finished in Prussian blue, with facings picked out in black. The general appearance of the car, as will be gathered from our illustration, is most pleasing.

PASSENGER TRANSPORT IN THE LAKE DISTRICT.

One of the earliest, if not the first, of motor coaches in use in this country is shown in the subjoined photograph. It was supplied by J. I. Thornycroft and Company, Limited, of Smith's Square,



A Thornycroft Coach Operated in 1904.

S.W.1, in 1904, to the Lake District Road Traffic Company, of Ambleside. The picture is interesting as showing the advance which has been made in body building. At that date the accommodation for passengers was but little better than was provided on the horse-drawn chars-a-banc. The Ambleside Company were pioneers in motor coach services in this country, and have ever since been consistent users of Thornycroft coaches, of which they run an extensive fleet. From their headquarters at Ambleside

40-H.P. Thornycroft Omnibus for Lakeland Traffic.

the Lake District Road Traffic Company are now catering not only for the tourist traffic, but ordinary daily passenger movement in the Lakeland district. The handsome manner in which this traffic is provided for will be gathered from a glance at the Thornycroft omnibus also shown on this page. This saloon vehicle is of 40 H.P. type "J," and it runs between Ambleside-Grasmere-Windermere. The body, by the Northern Counties Motor and Engineering Company, of Wigan, is a most creditable and comfortable example of modern body building.

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MOTOR TRAFFIC

STRAKER SQUIRE OMNIBUSES.

The accompanying photograph shows a double-deck omnibus built by Messrs. Straker-Squire, Limited, for Messrs. Harvey and Burrows, of Ware, Hertfordshire. This vehicle, from the Edmonton Works, N.18, was photographed at Waltham Cross, and it is of the special London type which secure the licence of the Metropolitan Police. It is one of three double-deck machines recently delivered to Messrs. Harvey and Burrows, with a probable purchase of six

Straker Omnibus at Waltham Cross.

more if the three are found satisfactory. The firm operate fifteen other omnibuses (single and double deck) over about 40 miles of road, the five services connecting Buntingford, Watton, and Waltham Cross with Ware and Hertford. A new route to Bishop's Stortford

Straker Double-Deck Omnibus to Seat 48.

is being opened up to connect with the National Omnibus Company's service there. A distinguishing feature of all the firm's services is their convenient change connections at various points.

WIGAN TRAMWAYS EXPERIMENT.—Wigan Corporation Tramways have agreed to suspend the running of double-deck cars on the Aspull route. They will substitute, experimentally, a service of double-deck cars converted to single-deck, or a service of motor omnibuses, or both.

COMMERCIAL MOTOR PARADE.

The 16th annual parade of commercial motor vehicles organised by the Commercial Motor Users' Association was held in Lincoln's Inn Fields, London, W.C., on Saturday, March 25, and proved highly successful. The object of the parade is to encourage drivers to take a personal interest in the driving and condition of their vehicles and to run them without accident. The parade is limited to "teams." The fact that the number of vehicles constituting a team is now three instead of six as hitherto was probably responsible for the improved entry this year. The figures were 225 vehicles entered by 32 firms, as compared with 180 vehicles exhibited by 18 firms last year. This was the largest entry yet recorded. The weather was very favourable, and the scene in the square was animated and imposing. The vehicles were lined up on all four sides, facing the centre, and much public interest was manifested in the proceedings. The silver challenge cup is awarded each year to the entrant whose "team," in the opinion of the judges' committee, is in the best condition, having regard to the class of work upon which the units are employed, the ages of the machines, and the total distances run by them. The award is made on the result of the engineer's report and the judges' inspection of the "team" on parade. Marks were given by the judges as follows—

(1) General turnout of complete teams.
(2) Condition of radiators in the case of petrol vehicles (or bunkers and tanks in the case of steamers), lamps, horns, etc.
(3) Tailboards and wings.
(4) Body work generally.
(5) Cleanliness of "under the bonnet" parts of petrol vehicles.
(6) Cleanliness of parts under driver's footboards.
(7) Cleanliness of engine of steam vehicles.
(8) Cleanliness of boiler lagging, steam fittings, etc., of steam vehicles.
(9) Cleanliness of motors of electrics.
(10) Cleanliness of batteries and terminals of electrics.

The vehicles generally were in splendid condition, though the "owner's declared mileage," ranging from 1,000 to 180,000, showed that the majority of them had already spent a more or less long and active life. The engines and bodywork were alike thoroughly clean, and the judges had difficulty in selecting the prize winners. The first prize, the "Commercial Motor" silver challenge cup, was awarded to Wethered's Brewery, Marlow, who exhibited a fine team of three Thornycroft petrol lorries. Each of the winning trio had completed over 30,000 miles in the regular service of its owners, and the condition of them all was extraordinarily good, showing scarcely any visible signs of their three years' service. (A second team of three Thornycroft lorries by the same owners was "highly commended.") The second award went to Shell Mex, Limited (the winners of the cup in 1921), whose splendid fleet included the following types of petrol-driven vehicle tanks, numbering in all a dozen—Leyland, Thornycroft, Albion, and Scammell. An even more varied array of vehicles shown by the Gas Light and Coke Company secured the third prize. These were of the following types, all petrol-driven—Commer lorry, Halley van, Napier van, Fiat lorry, Scout lorry, Straker-Squire van.

The drivers of the winning team received £2 each (and a silver medal); the drivers of the "runners-up" team, 30s. each; and the drivers of the third team £1 each.

PLYING FOR HIRE—LEGAL DECISION.

In the Divisional Court on February 13, the Lord Chief Justice delivered considered judgment in an appeal by the London Commissioner of Police, which involved the question whether motor coaches running between London and seaside resorts were coaches plying for hire within the meaning of the Metropolitan Public Carriage Act, 1869, and were accordingly required to be licensed under that Act. The appeal was against the decision of the Westminster magistrate, who decided that these motor coaches did not require to be licensed under the Act, as the people carried were in the nature of private parties. The Lord Chief Justice said the magistrate found that when the coach was standing in the street concerned no member of the public could have obtained a seat if he had not previously booked elsewhere. The process of soliciting was then over, and the driver was merely receiving passengers who had already booked. On this ground alone the magistrate was right in refusing to convict. The appeal was dismissed with costs.

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MOTOR TRAFFIC

THE VICTORY OMNIBUS COMPANY, LTD.

A New London Venture.

This company has been formed for the purpose of extending the facilities for omnibus travelling in the streets of London. A contract has been entered into with Leyland Motors, Limited, for the construction of the first fleet of 100 omnibuses, which will be of approved type embodying the latest improvements. Options have been obtained for the use of the Leyland Works, near Kingston, together with a trained staff, as a central repair depot, and also for garage sites at Lee Green, Stratford, Walham Green and Hanwell. Twenty-seven selected routes have been arranged, the majority of which will not compete with existing motor omnibus services. It is understood that the company has secured the services, as chief traffic manager, of a gentleman who for many years has been employed in all branches of motor omnibus traffic in the Metropolitan area, while the services of Mr. Percy Frost Smith, late managing director of Tilling-Stevens, Limited, have been retained as consulting engineer.

The capital of the company is £500,000, divided into 400,000 8 per cent. cumulative participating preference shares of £1 each, and 100,000 ordinary shares of £1 each. The directors are—The Viscount Maitland, chairman of the Marine and Industrial Trust, Limited, chairman; Sir Henry Bax-Ironside, director of the Westminster Electric Supply Corporation, Limited; Col. Alex. Weston Jarvis, director of Indiarubber, Guttapercha and Telegraph Works Company; Sir Percy Sykes; and Mr. Ronald A. Mason (managing director), director of the British Steamship Marine and General Insurance Company, Limited.

The prospectus is expected to be issued soon after the Easter holidays. The temporary offices are at 185 Piccadilly, W.1.

FIRE ENGINE'S DETACHABLE PUMPS.

Newcastle Fire Brigade's Acquisition.

On this page are photographs illustrating the recent delivery by Tilling-Stevens Motors, Limited, of a petrol-electric fire engine with dismountable pump, to the Newcastle-upon-Tyne Fire Brigade.

Tilling-Stevens Petrol-Electric Fire Engine at Newcastle.

The chassis is one of the well-known T.S.4 type, but has a shortened wheelbase and other special details compatible with fire engine requirements.

Although the principle of the petrol-electric is generally known, its adaptation for use on fire engines necessitates a description. A petrol engine of usual design is coupled to a dynamo, the current from which drives a motor, coupled to the rear road wheels through a propeller shaft and differential gear. This system is adapted to the requirements of fire fighting, and is embodied in the Tilling Stevens dismountable fire pump. This pump is of the two-stage, high-duty centrifugal type, and has a rated capacity of 300 gallons per minute. It is driven by a separate motor, and is designed as a separate unit, mounted on its own axle, which has large diameter artillery pattern wheels.

Normally the pump is locked on ramp plates on the chassis frame, but when required for pumping a distance away can be detached in a few seconds. A change-over switch on the dashboard diverts the current from the chassis motor to the pump motor, and from this point the pump is entirely controlled from the rear of the chassis.

The pump, being dismountable, can be man-handled to the source of water—a very advantageous feature, where it would otherwise be necessary for the whole vehicle to traverse soft ground to reach the water supply, or when the water supply is such that it would be impossible for a large vehicle to get sufficiently near. When the pump is dismounted the connection between the chassis dynamo and pump motor is maintained by a flexible rubber armoured cable, which is wound on a drum when not needed.

In addition, a first-aid pump is installed in the front of the chassis, with its hose reel immediately behind the driver's seat. This pump is so arranged that water from the 40-gallon tank, carried on the vehicle or from the town supply, can be utilised for small fires, where only a moderate supply of water is necessary. The fire engine was thoroughly tested both before and after delivery, and was found to be highly satisfactory in every way.

This machine makes the third Tilling-Stevens petrol-electric in the service of the Newcastle Brigade, previous deliveries having been a turntable ladder and a general utility wagon.

L.C.C. RAILLESS BILL.

Approval of Borough Councils to be Required.

On the motion for the second reading of the London County Council (Tramways, Trolley Vehicles and Improvements) Bill, Lieut.-Col. Pownall (Lewisham, E., C.U.) said the object of the Bill was to give powers to the London County Council to construct what was called a trackless trolley tramway from the Crystal Palace to Lee Green, and as two-thirds of the proposed tramway was to run through Lewisham, the inhabitants of that borough were strongly opposed to it, and the borough council condemned its introduction by 28 votes against eight. He therefore moved as an instruction to the Committee on the Bill to insert a provision making the erection of trolley vehicle equipment subject to the provisions of Section 23 of the London County Council Tramways (Electrical Power) Act 1900, which gave power to the local authority to veto the system of overhead tramway traction. Sir P. Dawson (Lewisham, W., C.U.) seconded the instruction. Sir A. Shirley Benn (Plymouth, Drake, C.U.) said that if the conduit system was adopted on the line projected it would mean an expenditure of £600,000, whereas the trackless trolley system would only mean an expenditure of £148,000. The instruction was carried by 86 votes against 72.

Vehicle Builders' Strike Settled.—A settlement has been effected of the strike, which had lasted several weeks, of members of the Amalgamated Society of Railway Vehicle Builders, Wheelwrights, Carpenters, and Mechanics, numbering over 10,000. The employers agreed to withdraw the demand for a 5 per cent. reduction in time work pay, the men accepting a reduction of 15 per cent. on piecework rates. The settlement will result in an average reduction of about 12s. per week per man on piecework. The Lancashire employers refused to withdraw the demand for a reduction of 6s. 3d. per week in time workers' wages, and the strike has consequently been prolonged in that area.

Straker-Squire Omnibuses.—The Progressive Motor Omnibus Company, of Wellingborough, who have already concentrated on Straker-Squire single and double-deck omnibuses, are running services in and about the county of Lincolnshire, where they are opening up several new routes.

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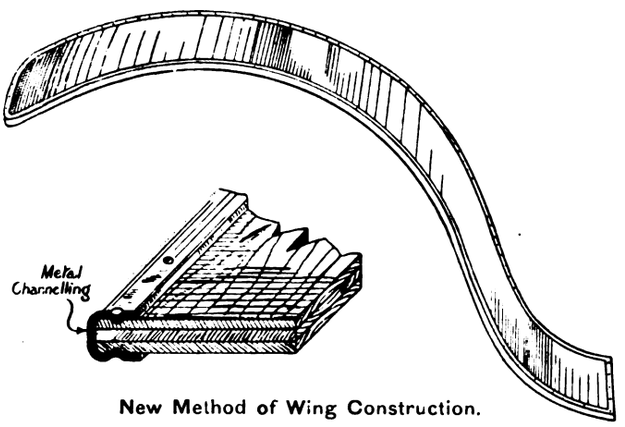
MOTOR TRAFFIC

NEW METHOD OF WING CONSTRUCTION.

Messrs. Strachan and Brown, of High Street, Kensington, a firm of coachbuilders who have been responsible for a number of improvements in the design of motor bodies, have just added to their achievements by introducing a new type of wheel wing which constitutes a radical departure in the construction of this important detail of body work. During their long experience as builders of omnibus and other types of bodies, they have been impressed by the preference shown for wood wings by many users owing to their light weight and point retaining properties in spite of their natural weakness and tendency to split.



New Method of Wing Construction.

The new wing which has been invented by Mr. J. M. Strachan, while retaining the advantages of the old wood wing, entirely does away with its drawbacks. Strength and freedom from splitting is obviated by substituting the best quality waterproof 3-ply for the ordinary solid wood. Additional strength as well as enhanced appearance is obtained by the ingenious device of binding the edges of the wing with metal channelling of U section. This is securely attached by rolling the metal edging on both sides at regular intervals with indentations. Rounded ends to the wings are included, while domed as well as flat wings can be supplied.

These wings are strong, attractive in appearance, and are undoubtedly an improvement upon the easily dented metal type and old-fashioned wood wing. These wings, for which a patent is pending, are supplied to the trade at attractive prices. The firm is well adapted for turning out quantities, and can give quick deliveries of either front or hind wings.

MOTOR VEHICLES FOR MUNICIPALITIES.

GLASGOW HEALTH COMMITTEE have purchased an additional motor ambulance.

KENT COUNTY COUNCIL have purchased a used Foden steam wagon for £400, and a light commercial motor.

MIDDLESEX HIGHWAYS COMMITTEE recommend the purchase of a motor car for the engineer at a cost not exceeding £1,200.

ROCHDALE CLEASING COMMITTEE have authorised the purchase of a short wheel-base petrol-driven vehicle for refuse collection.

CALCUTTA MUNICIPAL COUNCIL have ordered a Leyland motor gully cleansing machine fitted with appliances for road watering.

BATTERSEA BOROUGH COUNCIL have been recommended to purchase two motor vans for use in connection with the disinfecting station.

NEWPORT (Mon.) CORPORATION have accepted tenders of 5s. an hour for the hire of a motor van and 2s. 6d. an hour for the hire of a horse and man.

NEWCASTLE-ON-TYNE.—The Town Improvements and Streets Committee have recommended the Corporation to replace about 30 hired horse vehicles with mechanically-driven wagons, at an expenditure of £12,000.

SOUTHEND HEALTH COMMITTEE have decided to make provision in estimates for the provision of two motor vans to be used in connection with the ambulance and disinfecting work, and for motor vehicles for refuse collection.

SYDNEY (N.S.W.) MUNICIPAL COUNCIL are recommended by a committee to accept an offer by Leyland Motors, Limited, to supply and fix mechanically operated tipping gear to the Council's 2-ton Leyland lorry for the sum of £245.

NEWCASTLE CITY COUNCIL, who are borrowing £12,000 for the purchase of six heavy and four light motors for refuse collection, and a gully emptying machine, propose to consider the question of the use of machines for the loading of material at the depot.

HACKNEY BOROUGH COUNCIL have purchased a mechanical loading machine from Messrs. Ransomes and Raper, Ipswich. The machine is guaranteed to raise 10 cwt. of clinker from the ground level and deposit it in a Leyland lorry in half a minute, work which will take three men 2·4 minutes.

OMNIBUS SERVICES.

BIRKENHEAD.—The tramways department have acquired three Straker-Squire single-deck omnibuses from Plymouth Corporation Tramways at less than half the original cost of the vehicles when purchased about a year ago. The journey of 305 miles to Birkenhead was made by road. The Corporation have now a fleet of 15 omnibuses, the other types being Leyland single-deck and A.E.C. double-deck. It is intended to increase the services to outlying centres of attraction this summer.

BLACKPOOL.—Blackpool Watch Committee have authorised the chief constable to require motor coaches plying for hire from private premises to be licensed by the committee. The local Motor Coach Owners' Association having asked that coaches should be allowed to stand in public thoroughfares from which the coaches ply for hire, the committee have adhered to their previous decision requiring such vehicles to be run from private premises.

BRADFORD.—The Watch Committee have given permission to Messrs. G. H. Harris and Son to establish an omnibus service between Horton Grange Road and Marlborough Road. On the recommendation of the Fire Brigade Committee it has been made a condition that all omnibuses shall be provided with and carry fire extinguishing appliances.

BRIGHTON.—Licences have been granted for ten additional omnibuses, on condition that the vehicles are not run in competition with the Corporation tramways.

CHESTER.—Before issuing a licence to the Crosville Motor Company for a service of omnibuses between Market Square and the city boundary near Stone Bridge, the Watch Committee asked the Improvements Committee to consider whether a mileage charge should be made for the use of the roads. The latter committee decided that a charge of 3d. per car-mile be made in respect of Canal Street and Garden Lane.

CHINA.—Omnibus services are being inaugurated in numerous districts in China.

COLCHESTER.—Complaints have been made that residents in localities not provided with tramways are unable to get home to meals owing to omnibus proprietors being unable to carry short distance passengers, on account of an agreement which protects the tramways service. The Corporation have now partly relaxed the regulation, with the result that one company has started a dinner hour service.

LANCASTER.—The Tramways Committee have instructed the Town Clerk to write to the proprietor of the Lambsfield omnibus service protesting against the setting down of passengers within the borough, and also to call the attention of the Watch Committee to the matter. Subject to a satisfactory certificate of mechanical efficiency, the Watch Committee granted permission for an omnibus service to be run between Lancaster, Hallon, Caton and Brookhouse. The Watch Committee have arranged that Dalton Square shall be reserved as an omnibus centre from which omnibuses plying for hire along county roads should start.

LIVERPOOL.—The experimental services of A.E.C. omnibuses run by the tramways department after the theatre performances appear to have met with success. The vehicles serve Sefton Park, Walton, Mossley Hill, Garston and other districts at a single fare of sixpence. In some cases the popularity of the omnibuses is due to the provision of a through service for passengers who otherwise would have to make two or three tramcar changes.

LONDON.—Hampstead Borough Council have sent a strong protest to the Ministry of Transport and to the Commissioner of Police against the proposal of the London General Omnibus Company to run single-deck omnibuses along two roads crossing Hampstead Heath. The Council assert that the proposed service would detract from the amenities of the neighbourhood. On April 2 the L.G.O.C. introduced penny stages on the outer areas of a number of country routes.

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NEWCASTLE-ON-TYNE.—During the three weeks' strike of the tramway employees, motor omnibus services were given on most of the routes by the Northern General Transport Company, the United Automobile Services, Limited, and other owners.

PRESTON.—The Ministry of Transport have sanctioned the raising of a loan of £4,765 for the purchase of motor omnibuses, the loan to be repaid within a period not exceeding six years.

SOUTH SHIELDS.—As a result of the Sunderland-South Shields service of the Northern General Transport Company, the North Eastern Railway Company have withdrawn their omnibuses running between South Shields Station and Horton.

STRETFORD.—Two additional omnibus licences have been granted to the Mid-Cheshire Motor Omnibus Company, on condition that a regular service is maintained to Urmston.

SURREY.—Barnes Urban Council have appointed a committee to interview the Surrey County Council in regard to steps to be taken to obtain some measure of control in the case of roads used as omnibus routes.

MOTOR TRAFFIC NOTES.

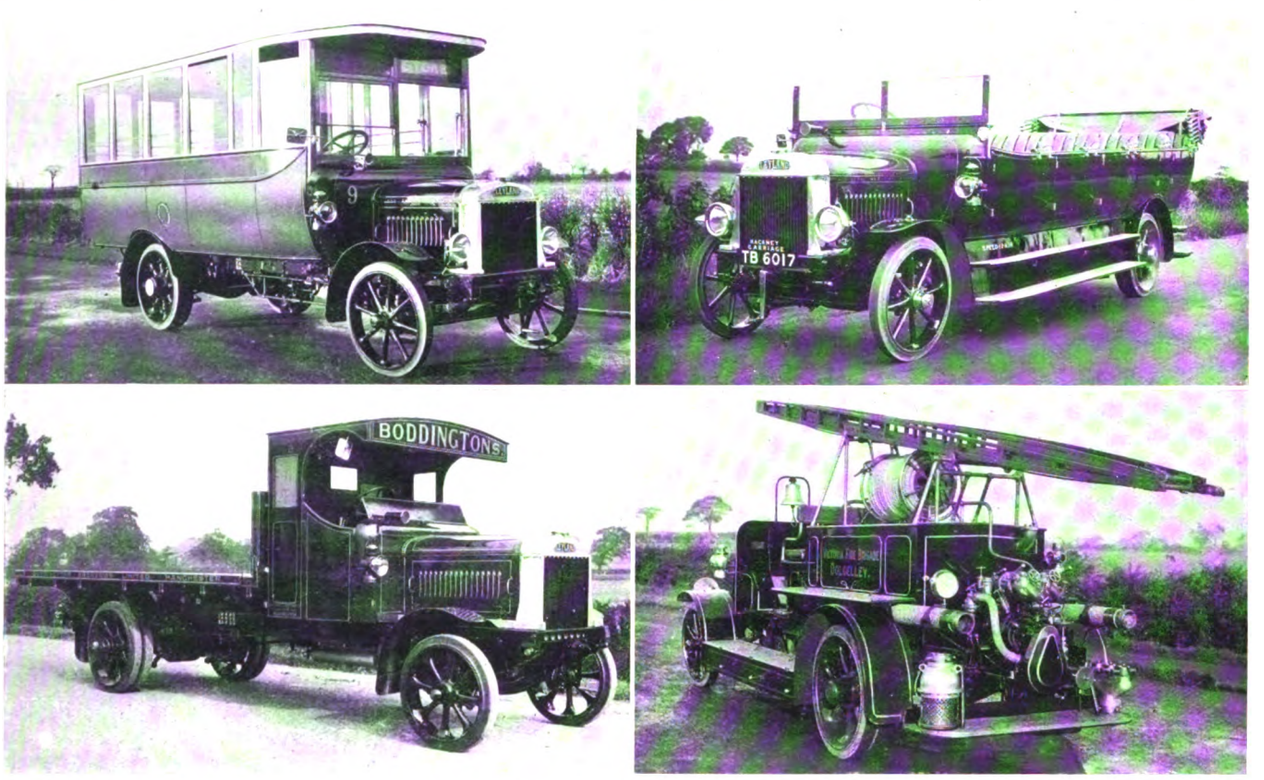
TRAFFIC DIVERSION.—Huddersfield Corporation have arranged to submit a scheme to owners of heavy motor wagons with a view to diverting heavy traffic to suitable roads.

DIVERSION OF HEAVY TRAFFIC.—A scheme has been submitted to the owners of heavy motor wagons by the Huddersfield Corporation for diverting heavy vehicles to suitable roads.

STRIKE AGAINST RAILWAY RATES.—On March 29 the Holland (Lincolnshire) Farmers' Union decided to withdraw farm produce traffic from the railways until the charges are reduced. One farmer has purchased motor lorries.

NEWSPAPER VAN WITH A STENTORPHONE.—One of the *Daily Mail* delivery vans has been fitted with a stentorphone, which gives musical selections, items of news, and excerpts from speeches. The selections can be heard a long way off even in noisy streets.

ISLE OF WIGHT TRAFFIC RIVALRY.—The president of the Isle of Wight Chamber of Commerce considers that if the railways of the island are to meet the competition of the motor coach, improvements must be effected. He suggests that the railways should be electrified.



Recent Examples of Leyland Vehicles.

TORQUAY.—The Tramways Company have for some years been running coaches for short trips and long distance tours. Omnibuses are also in operation, and at the annual meeting of the company on March 30 the chairman stated that the directors had under consideration the advisability of forming a subsidiary company to operate the omnibus undertaking, in view of the considerable expansion in the services which must take place. Shareholders' claims, in that event, would be taken into consideration. Arrangements were being made to extend the services at an early date to Exeter. There was undoubtedly great scope for omnibus services in Devonshire to deal with which the company, with its excellent organisation, was in a favourable position. The motor omnibuses capital account now stood at £45,828, as compared with £16,485, the increased expenditure being represented by additional rolling stock and the new garage. The additional profit in operating omnibuses had been £8,188, compared with £2,582.

WALLASEY.—Wallasey Tramways Committee propose to purchase four additional motor omnibuses from the Liverpool Corporation for £1,700 (£425 each), the cost to be charged to the tramways reserve fund.

LONDON-SOUTHAMPTON TRAFFIC.—During a discussion on the state of the roads at a meeting of the Hampshire County Council it was stated that a large proportion of the heavy motor traffic which arose during the coal miners' strike is being continued between London and Southampton.

MUNICIPAL BOOKING FOR COACH SERVICES.—The local Business Men's Association have asked Bridlington Corporation to again make arrangements for the booking of passengers using the chars-a-bancs travelling from Sheffield to Bridlington during the summer. The Corporation have agreed to do so.

MIDLAND DIVISION, C.M.U.A.—The annual parade of commercial vehicles under the auspices of the Midland Division, Commercial Motor Users' Association, has been fixed for July 8. At the annual meeting it was reported that a breakdown lorry and gang are now available at special rates for members.

TRAFFIC RELIEF IN MANCHESTER.—The Watch and Paving Committees have instructed the city engineer and the chief constable

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MOTOR TRAFFIC

to prepare and submit, after conference with the Ministry of Transport, a scheme for the erection of road direction signs for the purpose of diverting heavy traffic from the centre of the city.

Coach Stopping Places at Bradford.—The Licensing Committee have heard the views of a deputation of coach proprietors, and decided to recommend that the facilities for taking up and setting down passengers be restricted to the parts of the city outside a radius of a quarter of a mile from the town hall, with the exception of the authorised omnibus stands.

Inquiries into Road Accidents.—The Ministry of Transport Departmental Committee on Road Vehicles are considering the question of holding official inquiries into accidents on highways. Investigation is recommended particularly in cases in which accidents are alleged to be due to structural defects in roads and vehicles, the object being to ascertain the real cause, with a view to eliminating risks that might otherwise recur.

Ministry of Transport and Alternative Routes.—Recently the Essex County Council applied to the Ministry of Transport for an order prohibiting or restricting motor omnibuses and coaches on two road sections on the ground that the roads were unsuitable for use by vehicles of that class. The Ministry have now requested the County Council to consider the condition of the county as a whole, in order to enable the Ministry to give the broadest consideration to the important questions of alternative routes and the general traffic needs of the county, and to avoid the expense and inconvenience of holding a number of inquiries. The Highways Committee have now considered alternative routes, and propose to include commercial vehicles also, as suggested by the Ministry.

RAILWAYS AND ROAD TRAFFIC BILL.

Second Reading Carried.

On the motion for the second reading of the Railways (North Western and Midland Group) Bill on April 10, Sir W. Joynson Hicks moved the rejection of the Bill. If the Bill were passed the other groups of railways would apply to Parliament for similar powers, and, he asked, what chance road transport companies would have of competing with the huge aggregation of capital of the railways. They would soon be run off the roads. It was true that in 1904-1905 three railway companies got powers to run road traffic, but those powers had not been used to any great extent. Three other railway companies later applied for similar powers, and were refused by the House of Commons. In 1916 there were 600 road transport undertakings; to-day there were 3,000. Their capital was over £100,000,000, and they gave employment to 1,600,000 men. The object of the railway companies was to knock out those undertakings by competition and possess themselves of a monopoly of traffic by rail and road. The rates by road were lower than the rates by rail. He had not the slightest objection to a Royal Commission examining into the proposals. He wished the House to consider whether it was desirable to put the great powers proposed into the hands of the great railway companies.

Mr. G. H. Roberts, in seconding the motion, said that the railways ought to concentrate their resources and enterprise on the development of their legitimate business, viz., the carriage of passengers and goods along steel rails. If they would reduce their rates they would attract a good deal of the traffic that had gone on to the road.

Mr. P. J. Hannan said that the safeguards which the railway companies offered to provide would amply protect the interests of the public, and he contended that the extension of the powers to the railway companies would be entirely to the traders' advantage. The promoters were prepared to embody the safeguard that the revenue and expenditure of the capital investments in railways to their road transport activities must be kept apart from their accounts relating to the railway traffic on rails. They were also willing to insert a clause that the standard charges for the conveyance of the same class of goods by rail and by road should be practically the same.

Mr. Neal, Parliamentary Secretary to the Ministry of Transport, said the Bill raised the whole question of the relationship of the railways to the traffic of the country. He agreed that it would be difficult for Parliament to refuse these powers to any other company that sought them if permission were given for this Bill to become law. The House might be well advised to say that it was the general practice to give a second reading to a Private Bill unless there were paramount considerations of the public policy to the contrary, and to let these matters receive the fullest inquiry by a Committee of the House. In his opinion it would be wise to reject it unless the dangers of monopoly were adequately safeguarded against. In that case then, in the interests of transport and competition, he suggested that the law might well become operative.

Mr. J. H. Thomas strongly supported the Bill. It meant not the setting up but the breaking down of monopoly. He contended that the relations between the companies and the employees were better than ever before, and the efficiency of the railway service was greater. There was more anxiety to do the right thing.

After a long debate the closure was agreed to, and the second reading was carried by 146 votes to 141.

THOMAS TILLING, LIMITED.

Annual Meeting.

Mr. Thomas Tilling, presiding at the 25th annual meeting of Thomas Tilling, Limited, on March 30, said that the company ran its first omnibus 71 years ago this year, viz., in the exhibition year of 1851. They had just replaced a portion of their fleet of motor omnibuses by new and more costly vehicles, with greater carrying capacity, and he hoped he might be excused if he expressed a little pardonable pride in the vehicle they had now evolved. The company now had a direct or indirect interest in twenty-two provincial road transport undertakings. He alluded to the greatly decreasing number of accidents, which had been brought about partly by the increased skill of the motormen and partly by the greater care the public exercised on their own behalf, helped, he had no doubt, by the excellent "Safety First" propaganda. The present system, whereby the whole of the motor omnibuses in London are operated from one controlling centre, had produced surprising results. It had eliminated wasteful competition, and the public had shown their appreciation of the benefits secured by riding in such numbers as the most far-sighted would have considered impossible a short time ago. The earliest horse omnibus carried 24 passengers, and a journey out and home averaged 10 miles. They new carried 48 passengers, and in some cases 54, and journeys of 50 miles were undertaken. A dividend of 15 per cent., less tax, is paid on the ordinary shares for the year 1921, and a sum of £64,148 is carried to special reserve for properties, investments, etc., a balance of £62,257 being carried forward, subject to liability for excess profits duty in respect of the year 1920. Messrs. W. Tilling, R. M. Tilling and J. F. Heaton were re-elected directors.

MR. BARNES' PLEA FOR MORE PRODUCTION.

An able and frankly critical address on "Some Common Fallacies in Trade and Industry" was delivered by Mr. G. N. Barnes, C.H., M.P., at a conference of the Industrial League and Council held in the Caxton Hall, S.W. Mr. H. E. Blain, C.B.E., vice-president of the League, occupied the chair, and paid a warm tribute to Mr. Barnes, who was, he said, universally recognised as possessing honesty of purpose and integrity of aim.

Mr. Barnes declared that the improvement of the conditions under which we live would come with the inauguration of a better social sense, of a better feeling between men and women of all classes; it would never come through malice or class conflict. Some of their friends told them that if higher wages were paid workmen would be able to buy and everybody would be employed. But the problem was not so easy as that. The critics of the present system forgot that the British workman did not consume the products he turned out, except a very small proportion of them. Our troubles arose therefore from the fact that we had to produce for people overseas—at a price—or if we could not, then other countries would cut us out. A larger unit of production per head on the part of British workmen and a greater effort to attract the foreign buyer would do more to lessen unemployment than anything else he knew. It was not so much wages that were at the bottom of industrial disputes; in the era through which we were passing, when machinery played an increasingly important part, the paramount necessity was to get the greatest output from that machinery. One of the main things we must do was to get this into the heads of the workman, and he would soon find that a few shillings per week on his wages would be regarded by his employer as comparatively unimportant. Employers and workmen must resolve to get the best out of the present industrial system by friendly contact in a spirit of co-operation and good will, though the Government might help by reducing taxation to the lowest possible limit.

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THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

LONDON, APRIL 15, 1922.

"KEEP TO THE LEFT."

There seems a probability that general recognition will be accorded before long to the suggested new rule of the footpath requiring pedestrians to keep to the left. The sooner the public are brought to observe such a rule the better it will be both for themselves and those concerned in the operation and direction of street traffic. The matter has been receiving well-merited attention from public bodies of various kinds during the last few months, and quite recently the London Safety First Council decided to recommend the new rule to all the London Municipal Authorities. The origin of the agitation is, of course, by no means recent. So long ago as 1917 Mr. James Dalrymple, general manager of Glasgow Corporation Tramways, in a letter to the Executive Council of the Municipal Tramways Association, drew attention to the desirability of the left-hand rule, and he wrote a paper on the subject, which was read at the annual conference of the Association at Blackpool in September of the same year, when Mr. H. E. Blain, of the London Underground Railways, cogently supported the proposed change. Glasgow has now taken up the idea enthusiastically and a very active publicity campaign is being conducted in order to convert the public. From the Journal of the M.T.A., in which much prominence is given to the innovation, we learn that its theme has even been expressed in comic verse and set to music in Glasgow. That honour may fall where it is due, the piece has been dedicated to Mr. Dalrymple. Though the movement as a whole may be said to have had an "unofficial" origin, the Advisory Committee on London Traffic in 1920 formed the opinion "that the institution of a left-hand rule . . . would be preferable to the existing custom." Last year the Transport Ministry informed the Safety First Council that there would be no objection to their recommending municipalities to adopt the rule. While the change has been welcomed and applied in many places, including Edinburgh, Glasgow, Exeter, Bristol and Halifax, and while others (notably Birmingham) are considering its adoption, the Corporation of the City of London forms a peculiar exception. It is, of course, recognised that the experience of the City Police in handling traffic is practically unrivalled; but it is difficult to understand why the special Police Committee which considered the matter should express themselves as opposed to the revision. They point out that the existing practice has been the custom from time immemorial, and also emphasise "the great danger involved in stepping off the kerb into the road, thus meeting vehicles coming in the opposite direction." The latter consideration is in direct conflict with the chief motive underlying the proposed change. It is argued by the left-hand advocates—and surely quite soundly—that it is far better to step into the roadway with one's eyes on the approaching traffic than to step off with the danger coming up behind one's back. There is no argument in the fact that the present custom is hoary with age. Vehicular traffic moves with ever-increasing density and speed, and the latest returns show that the number of street accidents has grown larger. Tramway authorities, we believe, will see in the new rule a means of making the streets safer for their passengers, who have constantly to pass from the kerb to board the cars. Given adequate publicity, there should be no difficulty in educating the public to the wisdom of the change.

RAILWAYS AND ROAD TRAFFIC BILL.

SECOND READING CARRIED.

On the motion for the second reading of the Railways (North Western and Midland Group) Bill on Monday night, Sir W. Joynson-Hicks moved the rejection of the Bill. If the Bill were passed, the other groups of railways would apply to Parliament for similar powers, and he asked what chance road transport companies would have of competing with the huge aggregation of capital of the railways. They would soon be run off the roads. It was true that in 1904-1905 three railway companies got powers to run road traffic, but those powers had not been used to any great extent. Three other railway companies later applied for similar powers, and were refused by the House of Commons. In 1916 there were 600 road transport undertakings; to-day there were 3,000. Their capital was over £100,000,000 and they gave employment to 1,600,000 men. The object of the railway companies was to knock out those undertakings by competition and possess themselves of a monopoly of traffic by rail and road. The rates by road were lower than the rates by rail. He had not the slightest objection to a Royal Commission examining the proposals. He wished the House to consider whether it was desirable to put the great powers proposed into the hands of the great railway companies.

Mr. G. H. Roberts, in seconding the motion, said that the railways ought to concentrate their resources and enterprise on the development of their legitimate business, *viz.*, the carriage of passengers and goods along steel rails. If they would reduce their rates, they would attract a good deal of the traffic that had gone on to the road.

Mr. P. J. Hannan said that the safeguards which the railway companies offered to provide would amply protect the interests of the public, and he contended that the extension of the powers to the railway companies would be entirely to the traders' advantage. The promoters were prepared to embody the safeguard that the revenue and expenditure of the capital invested by railways in their road transport activities must be kept apart from their accounts relating to the railway traffic on rails. They were also willing to insert a clause that the standard charges for the conveyance of the same class of goods by rail and by road should be practically the same.

Mr. Neal, Parliamentary Secretary to the Ministry of Transport, said the Bill raised the whole question of the relationship of the railways to the traffic of the country. He agreed that it would be difficult for Parliament to refuse these powers to any other company that sought them if permission were given for this Bill to become law. The House might be well advised to say that it was the general practice to give a second reading to a private Bill unless there were paramount considerations of the public policy to the contrary, and to let these matters receive the fullest inquiry by a Committee of the House. In his opinion, it would be wise to reject it unless the dangers of monopoly were adequately safeguarded against. If this were done, in the interests of transport and competition, he suggested that the Bill might well become operative.

Mr. J. H. Thomas strongly supported the Bill. It meant not the setting up, but the breaking down of monopoly. He contended that the relations between the companies and the employees were better than ever before, and the efficiency of the railway service was greater. There was more anxiety to do the right thing.

After a long debate the closure was agreed to and the second reading was carried by 146 votes to 141.

BIRMINGHAM AND NEW FOOTPATH RULE.—Birmingham Watch Committee have received a recommendation from the Tramways Committee that pedestrians should observe the "keep-to-the-left" rule of the footpath, and have referred the matter to the Judicial Sub-Committee.

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THE TRAMWAY AGREEMENT OF MARCH, 1922.

In the Journal of the Municipal Tramways Association for April Mr. J. Beckett, the general secretary, makes the following comment on the agreement made between the tramway employers and employees on March 9, 1922, the terms of which were given in our issue of March 16, last.

"On March 9, 1922—almost three years after the first National Agreement was made—the National Council adopted with unanimity the terms of a new agreement, after seven days' negotiation, during which time every aspect of the conditions of service for tramwaymen was thoroughly examined and sifted. The members may take it that the new terms represent the best compromise that could be made with the goodwill and consent of both parties, and all parties are now invited by their representatives upon the National Council to adopt them. So far as the men are concerned, their representatives on the National Council—eighteen out of twenty-two who were present—voted in favour of the terms, and they will recommend their adoption to the various branches. We may, therefore, reasonably count upon acceptance by them.

So far as municipal tramways are concerned, it is not proposed to convene another special general meeting of the Association. Their representatives have done their utmost to give effect to the decision of the last special general meeting, which was held on December 9 last. Those representatives now appeal to all the constituents of the Association to put the terms into force as and from the commencement of the first full pay period after April 17, 1922, and they rely upon their loyalty and co-operation. During these prolonged negotiations Mr. Fearnley has occupied the onerous position of spokesman for the representatives of Municipal tramways, and, by common consent, has discharged his duties with conspicuous ability and success. It is not putting it too high to say that the whole industry is greatly indebted to him for the personal sacrifice that he has made during recent weeks in the common interest. I know *something* of it."

The Journal also contains a statement of a new income tax scheme of annual allowances for wear and tear of tramway permanent way, the text of the new agreement of March 9, 1922, and a report of a discussion in the House of Lords on March 9 on the rule of the footpath.

RATIFICATION OF THE AGREEMENT.

At a meeting of the National Joint Council on Tuesday, the resignation of Mr. W. J. Squires was accepted with regret, and the best thanks of the Council were accorded to him for his splendid services as chairman of the Council since it was formed. Mr. J. M. McElroy's resignation was also accepted with regret, and the Council placed on record their appreciation of his services and untiring devotion to its interests. Mr. A. L. C. Fell and Mr. John Barnard were elected members of the Council.

Reports of the constituent associations respecting the revised agreement were received. Mr. Fearnley reported that there was no dissentient among the municipal tramway authorities, and Mr. Tegetmeier reported that the Conference of Tramway and Light Railway Companies had recommended to the companies concerned the adoption of the agreement. Mr. Cliff reported that the employees had by a majority decided to accept the agreement.

A question was raised as to the meaning of the words "this date" referred to in clause 2 (*a*) of the revised agreement, and it was resolved that the words "this date" be construed as the date of the signing of the agreement, viz., April 11, 1922.

The committee recommended that the terms and conditions of service of the permanent way employees who had been working under the March, 1919, agreement, should be the subject of local negotiation and agreement between the undertakings concerned and the trade union representatives.

L.C.C. TRAMWAY MATTERS.

At the meeting of the London County Council, on Tuesday, the Highways Committee presented several reports, two of which are likely to have an important bearing on the future of the Council's Tramway undertaking.

London Traffic Arrangements.

The Highways Committee presented a long and important report dealing with the position of London traffic. After referring to the reports of the Royal Commission and Select Committees which have at various times considered the question from 1903 to the present time, they recommended the passing of the following resolution :—

That the attention of H.M. Government be again directed to the resolutions of the Council on the subject of London traffic arrangements, which were communicated to the Government on May 5, 1921 ; that it be pointed out that the decisions of the Council in question were come to after protracted negotiations had taken place between representatives of the Council and of the London Underground Group of Railways, negotiations that were initiated under the auspices of the Minister of Transport with the object of devising means of meeting in the best possible way the traffic needs of London ; that the Government be informed that, in the opinion of the Council, the organisation of London traffic on satisfactory lines is endangered by the continued delay in adopting measures to give effect to the repeated declarations of Royal Commissions and Select Committees as to the pressing need for reform ; and that the Government be further informed that the Council considers that the difficulty of reaching a settlement of the traffic problem as a whole will be enhanced by any steps that may be taken by the Government that have the effect of assisting particular traffic undertakings operating in London and the surrounding districts, without recognising the essential community of the traffic interests of the entire area.

London United Tramways, Ltd.—Fares.

The agreement with the London United Tramways for through running provides that the Council shall fix the fares on the Wimbledon to Merton line and the company those on the Hammersmith line. The Highways Committee reported that they propose to divide the Tooting Broadway and Wimbledon line (2.3 miles) into four sections of an average length of nearly .6 miles each. They propose that the maximum ordinary fare from Wimbledon to London termini shall be 6d., the workmen's return fare 6d., and that transfers now given from the county boundary at Merton should be extended to Wimbledon ; further, that the 2d. maximum mid-day fare shall apply as between Wimbledon and the Embankment on the same conditions as prevail on the other parts of the system. As regards the service which the Council will provide to Kew Bridge, the fares will be the same as those charged by the company as between Hammersmith and Kew Bridge, but the committee are negotiating with a view to securing a maximum ordinary fare and workmen's return fare from Kew Bridge to the London termini at less than the sum of the local fares. The 2d. maximum mid-day fare will not be available west of Hammersmith, as the company's local fare is 3d. between Hammersmith and Kew Bridge.

Tenders for Stores, Etc., for the Tramways.

Under regulation No. 661 arrangements have been made for tenders for certain classes of tramway stores, materials, etc., to be obtained from selected firms. The Highways Committee have decided not at present to include the names of foreign firms on the selected lists of tenderers. The committee wish, however, to make it clear that in cases in which there is reasonable ground for believing that tenders are not being submitted on an independent basis, and that advantage is being taken of the limitation to British firms, they will not hesitate to invite tenders by advertisement. In this case foreign firms will be at liberty to tender equally with British firms.

It is provided in Council's regulation No. 662 that in cases in which the publication of the estimated value of a contract for stores, etc., other than coal and coke, may lead to the disclosure of the individual price or prices quoted, the particulars instead of being included in the report of the Highways Committee or the Stores and Contracts Committee, shall be laid on the table for the information of members. In accordance with the recommendation of the committee, the publication of prices of coal and coke will now be dealt with in the same manner as those relating to general stores.

Motor School Superintendent.

To fill the position of motor school superintendent in the tramways department, rendered vacant by the death of Mr. R. Baron in January last, applications were invited from the staff of the tramways department, and 61 applications were received. Mr. E. T. Bancroft, at present day-foreman at the Clapham depot, has been selected by the Highways Committee for the position. The salary is £255 a year, rising by annual increments of £15 to £355 a year (on the pre-war basis).

Power Distribution.

It is proposed to fix protective relays of a modern type on the tramway distribution system, for disconnecting a faulty cable or machine from the circuit, at an estimated cost not exceeding £1,500.

Traffic Returns.

The Highways Committee submitted a statement of traffic up to the week ended March 29, when the total traffic receipts from April 1, 1921, were reported to be £5,045,565, an increase of £157,990 over the corresponding period for the previous year. The passengers carried aggregated 27,252,907, an increase of 921,817.

Mr. J. M. Gattie, chairman of the Finance Committee, in reply to a question, said that the total charges borne by the rates in respect of the tramway service was £315,892. The total amount paid out of tramway receipts for street improvements was represented by a debt charge of £392,260. The total amount contributed towards the borough rates from the tramway receipts from April 1, 1912, to March 31, 1921, was £1,229,859.

All recommendations were adopted with the exception of the long report of the Highways Committee on London Traffic Requirements, which stood over to enable members to consider it carefully.

THE INTERNATIONAL TRAMWAY UNION.

Proposed Congress in October.

At a meeting of the International Union of Tramways held at Brussels on February 18, under the presidency of M. C. Burlet, the organisation was reconstituted. In accordance with the Belgian law the organisation will henceforth include representatives of allied and neutral countries. The assembly decided that a congress should be held in Brussels in the first fortnight of October of this year. The President explained that, owing to lack of time, the usual questionnaire would not be sent out, and discussions would be limited to subjects covered by papers which members would submit. The Council would undertake the necessary arrangements for the congress. The general secretary, M. H. Camp, gave a satisfactory account of the financial situation of the Union. At the conclusion of the meeting the President thanked the delegates, who included representatives of 128 undertakings in various countries, for their attendance, asked their cordial support of the revived association, and invited all members to attend the autumn meeting.

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GOVERNMENT HELP FOR TRADE.

LARGE LOANS GUARANTEED FOR ELECTRIC TRACTION DEVELOPMENT.

Particulars are given in a White Paper issued on Tuesday of the guarantees for loans which the Treasury have approved up to March 31 under the Trade Facilities Act, 1922. The total amount is £14,958,145, and the list includes the following :—

Underground Railways of London, Ltd.—A loan of £5,000,000 for 50 years, for the enlargement of the tunnel of the City and South London Railway, improvement of stations and provision of new rolling stock, and the extension of London Electric Railway from Golders Green to Edgware. The plans for the work are nearly complete, but a few weeks will elapse before an actual start on the work can be made.

The South-Eastern and Chatham Railway.—A loan of £6,500,000 (25 years) for the electrification of suburban lines. Negotiations for the carrying out of this scheme are well advanced, but it will be some time before the company will be able to commence the work, as many details of a complicated character have to be arranged.

Calcutta Electric Supply Corporation, Ltd.—A loan of £500,000 (25 years—redeemable after 15 years) for the purchase and installation of additional generating plant and buildings, additional high-tension cables and transformers and direct current mains.

Minehead Electric Supply Company.—A loan of £4,500 (25 years), for the purchase of a generator and overhead mains.

Kent Electric Power Company.—A loan of £15,600 (20 years) for the provision of mains, transformer apparatus and station plant.

MANCHESTER TRAMWAYS MANAGERSHIP.

THIRTY-EIGHT APPLICATIONS FOR THE VACANCY.

For the appointment of general manager of Manchester Corporation Tramways, rendered vacant by the resignation of Mr. J. M. McElroy, 38 applications have been received. The Tramways Committee on Tuesday considered the claims of five applicants who had been selected from the 38 by a special sub-committee, and further reduced the number to three, all of whom will be asked to appear before the Committee at its meeting on April 25. The names of the three applicants from whom the final selection will be made are :—

Mr. E. S. Rayner, general manager of Hull Tramways ;
Mr. J. S. D. Moffet, general manager of Belfast Tramways ;
Mr. H. Mattinson, chief civil engineer to Manchester Tramways.

No salary has been fixed for the position, each of the applicants having been asked to state what figure he would require.

MISCELLANEOUS NEWS AND NOTES.

This Week's Issue.—Owing to the occurrence of Good Friday, this week's issue is being printed on Wednesday night, and consequently the list of traffic returns for the week is incomplete.

Newspapers by Tramcar at Halifax.—The Tramways Committee is entering into an agreement with the local Newsagents' Wholesale Supply Company for the carriage of newspapers on the cars at a charge of £80 per annum.

Llandudno Strike Ends.—The strike of employees of the Llandudno and Colwyn Bay Electric Railway Company, which commenced on February 18, has been amicably settled as a result of the intervention of a representative of the Labour Ministry.

St. Helens Tramway Extension.—St. Helens Tramways Committee have decided to lay a double line of track from Croppers Hill to the borough boundary and to relay the track in Church Street. For these purposes application is being made for a loan of £40,000.

Track Doubling at Doncaster.—The Corporation have decided to apply to the Ministry of Transport for sanction to borrow £2,150 for the doubling of the single tramway track from the loop in Arksey Lane to a bend in High Street on the Doncaster side of the Bentley Mill bridge.

No Cheaper Fares at Blackburn.—Two members of Blackburn Town Council asked for a reduction of 1½d. tramway fares to 1d., on the ground that wages had been reduced, as well as the price of steel. Alderman C. Higham (chairman of the Tramways Committee) replied that the reductions had not made the lowering of fares justifiable.

Glasgow's All-Night Car Service.—In a report on the all-night car service, Mr. J. Dalrymple, general manager of Glasgow Corporation Tramways, says the regular passengers, as distinct from those who occasionally use the night cars, number 300. He adds that the all-night service is given at a bare cost in wages and energy of £6,610 per annum.

Standing Passengers in London.—The question of allowing a certain number of excess passengers to stand inside omnibuses and on the lower decks of tramcars in the Metropolitan area has again been considered by the Scotland Yard authorities. It is understood that the relaxation of the statutory provisions will be continued for another 12 months.

Centre Poles for Princes Street, Edinburgh.—In the House of Commons, on Monday, Mr. Neal stated that he had received the report of the inquiry carried out by the Ministry of Transport into tramway traction at Edinburgh. He had decided to adopt the recommendation that the request of the Corporation of Edinburgh for permission to put up centre poles to carry the overhead electrical equipment in Princes Street and to alter the position of the rails on the northern side of the street should be granted. The report, Mr. Neal added, would be published, if desired.

Motor Vehicles Taxation.—The Departmental Committee on the Taxation and Regulation of Road Vehicles is to be asked by the Ministry of Transport to consider afresh the whole question of the taxation of mechanically-propelled vehicles in the light of the experience which has now been gained of the work and incidence of the licence duties imposed by the Finance Act, 1920.

New Edinburgh Cars.—The 16 new car bodies which Edinburgh Corporation ordered in December last from McHardy & Elliott, a local firm of coachbuilders, will be of the vestibule type, giving full protection to the driver and conductor. Wide entrances and exits are provided, and to facilitate rapid unloading an emergency door has been installed, which can be operated by the driver.

The Engineers' Strike.—Mr. E. Garcke, presiding at the meeting of the Brush Electrical Engineering Company, on Monday, said that if the members of the Amalgamated Engineering Union did not soon return to work it would become a question with many firms either of shutting down their works completely or endeavouring to replace the skilled men by training others to do their work.

Glasgow Tramways Order Approved.—At a special meeting of Glasgow City Council, approval was given to the Glasgow Corporation (Tramways, etc.) Order, 1922. The Order seeks power, among other things, to authorise the Corporation to take over and work the tramway undertaking of the Airdrie and Coatbridge Trustees, acquired by the Corporation at a cost of £82,250, and to acquire further borrowing powers for tramways.

The Electricity (Supply) Bill.—In the House of Lords on Tuesday, the Electricity (Supply) Bill reached the report stage, which was concluded. Viscount Peel, on behalf of the Government, volunteered an amendment to Clause 1, providing that a scheme constituting a joint electricity authority should fix, with reference to the estimated capital expenditure of the authority, the maximum amount which might be borrowed by the authority, and the authority should not have power to borrow under this section sums in excess of the amount so specified, unless authorised to do so by a subsequent special order. The amendment was accepted.

Rule of the Footpath in London.—The London "Safety First" Council have decided to request the municipal authorities in Greater London to take concerted action to bring into force on July 1 next a change in the rule of the footpath, whereby pedestrians would be required to walk on the left. Mr. H. E. Blain, secretary of the Council, reported that the Chief Commissioner of Metropolitan Police had intimated it was not the intention of the Metropolitan Police to oppose the change. With the solitary exception of the City of London Police, the authorities generally were, he claimed, in favour of it. Many of the important provincial cities had now definitely adopted the left-hand rule.

Workmen's Fares at Nottingham.—At the last meeting of the City Council the chairman of the Tramways Committee, Mr. J. Clarkson, said he did not think the granting of return tickets to workmen at reduced fares would be considered by the Tramways Committee. Workmen were still being carried in the morning at pre-war fares. During the previous year 3,000,000 workmen had been carried at such fares, while 53,000,000 passengers were carried at ordinary fares. The latter had paid increased fares for over two years, and they must receive the first consideration when the time arrived for any concessions to be made. At the present time no workmen's return tickets are issued, but passengers leaving the terminus before 7.30 a.m. are carried at fares which average .35d. per mile.

New Transport Workers' Federation.—There is a project for a new Transport Workers' Federation, which, it is estimated, would include about two million members. The National Union of Railwaymen, the Locomotive Engineers and Firemen, and the Railway Clerks' Association, as well as all the affiliated unions of the National Transport Workers' Federation, are considering the matter. They have been asked to pass the new scheme of confederation at their forthcoming annual meetings. The Central News learns that those who are supporting the new movement believe that the enlarged Transport Workers' Federation would become more influential than the old Triple Alliance. It appears that the plan is that the Federation should be self-contained and be its own advisory body, but that each affiliated unit should have the fullest autonomy and consider only national questions that affected any of its constituents. The project has strong opponents as well as enthusiastic promoters.

Leeds Deputation to London.—The deputation of the Leeds Tramways Committee which visited London on April 3rd chose the most unfavourable day of the year for their inspection. Snow and rain fell during most of the day and the temperature was disagreeably low. It was, in fact, the worst day that London has experienced this winter ; but the deputation heroically carried out their full programme. They were met in the morning by Mr. C. J. Spencer, general manager of the London United tramways, and travelled by motor car to Kingston, where they inspected the one-man car which is in service there, and which was fully described in our issue of February 16. On returning to London they were received by Mr. A. L. C. Fell, general manager of the London County Council tramways, and inspected the working of the trailer cars both at the outer terminus at Merton and on the Embankment during the evening rush hours. The deputation were much impressed with the one-man car, and it is possible that their investigation of the trailer question will in time have practical results at Leeds, although it is felt that certain local conditions make the use of trailers there particularly difficult.

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PERSONAL.

Professor J. A. Fleming has been compelled, on account of illness, to cancel all engagements for the present.

Mr. R. H. Pitts, O.B.E., has been appointed to act as staff officer for the London Underground Companies. His duties in this connection will be in addition to those he has previously filled as Secretary of the Joint Standing Committee of the grouped companies.

Mr. J. B. Hamilton, general manager of Leeds Corporation tramways, who sailed in October last for a tour round the world, has returned. It is credibly reported that he has investigated every known form of transport from the rickshaw to the latest high-speed "elevator" in New York. His many friends will be glad to know that his shadow has not diminished nor his genial ardour abated.

FINANCIAL.

Bexley and Dartford Tramways.—There is an estimated deficiency on the Bexley Urban District Council Tramways and Dartford Light Railways for the year ended March 31, 1922, of £2,887.

Brown, Bayleys' Steelworks, Ltd.—The directors have decided to defer the question of payment of the preference dividend, and intimate that no interim dividend will be paid on the ordinary shares.

Loss on Darlington Tramways.—At a meeting of Darlington Town Council, Alderman Sir Charles Starmer reported that the loss on the tramways for the past year was £2,364, which, he said, was about what they estimated six months ago.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended April 1 give total receipts of £345,460, or £43,996 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £177 6s. 10d. per mile of single track, and last year at the rate of £199 18s. 6d., thus showing a decrease for the week of £22 11s. 8d. per mile open.

Metropolitan-Vickers' New Zealand Order.—A Reuter message from Wellington, New Zealand, states that the Government has accepted the tender of the Metropolitan-Vickers Electrical Company, of Manchester, amounting to £30,764 for the supply of switch gear for the Mangahao hydro-electric installation, which will provide the Wellington district and city with electrical power. The installation will have the highest electrical pressure in Australasia and the best and most reliable controls were necessary. The lowest tender received was one for £24,666 from America.

Leeds City Tramways.—The receipts of the Leeds City tramways for the year ended March 31, 1922, show a decrease as compared with the previous year of £35,967, or 3.612 per cent. The car miles run were fewer by 850,119, or 8.353 per cent. A comparison of the results of the two years are given below :—

	Year ended Mar. 31, 1922.	Year ended Mar. 31, 1921.	+Increase. —Decrease.	%
Total receipts	£959 671	£995,638	— £35 967	3·6
Miles run	9,326,755	10,176,874	— 850,119	8·3
Passengers carried ..	129,707,972	138,621,331	— 8,913,359	6·4
Receipts per mile.. ..	24·695d.	23·480d.	+ 1·215d.	5·1
Average fare per passenger	*1·741d.	1·696d.	+ ·045d.	2·6
No. of times population carried	233	249	— 16	6·4
Amount paid per head of population	33s. 9d.	35s. 2d.	— 1s. 5d.	4·0

*Fares increased June, 1920.

Sandberg "Insitu" Rail Hardening Process.—The Scholey Construction Co., Ltd., 56, Victoria Street, S.W.1, have secured a contract for the "Insitu" treatment of 2¼ miles of track for the Newcastle Corporation Tramways. They are also carrying out extensive contracts for the Wallasey, Liverpool, Leeds and Hastings tramways. Messrs. Elder Smith & Co., Ltd., of London and Sydney, have obtained a contract for the "Insitu" treatment of three miles of track for the New South Wales Government tramways in Sydney. Orders received up to date include the treatment of 150 miles of tramway track on the following undertakings :—Croydon, Bournemouth, Glasgow, Leeds, Manchester, Sheffield, Liverpool, Newcastle, Birmingham, Metropolitan Electric, Bristol, Derby, Reading, S. Shields, Bolton, London County Council, Edinburgh, Bury, Birkenhead, Wallasey, Bradford, Cardiff, Hastings, Sydney (N.S.W.), London United, Paris.

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	April 5	3,782	3 274	— 508	44½	155.730	— 13.567
" Motor Buses	" 5	62	142	+ 80	44½	10.003	+ 8.515
Ayr Corporation ..	" 8	586	465	— 120	47	32,376	— 2 743
Barrow Corporation ..	" 1	943	580	— 363	52	41,923	— 5.097
Belfast City	" 7	12.632	11.986	— 646	1	11.986	— 646
Birkenhead Corporation	" 9	2.522	2.450	— 72	1½	3 160	— 491
" Motor Buses	" 9	508	543	+ 35	1½	737	— 36
Birmingham Corporat'n	" 1	32.156	27.858	— 4.298	52	1,512,000	— 133,544
" Motor Buses	" 1	2.324	1 613	— 711	52	100.998	— 3,192
Blackburn Corporation	" 5	2 613	2.231	— 382	1½	3 302	— 1,474
Bradford Corporation..	" 1	16 364	13.286	— 3.078	½	3 028	+ 2 329
Burnley Corporation ..	" 8	3.265	3 281	+ 16	..	.	..
Burton-on-Trent Corp.	" 9	612	528	— 84	1½	671	— 121
Bury Corporation ..	Mar. 31	1.427	1.457	+ 30	52½	125,401	— 6,312
Chatham & District ..	" 30	1.994	1,498	— 496	13	18,565	— 2,517
Chesterfield Corporat'n.	" 31	266	258	— 8	52	30.462	— 1,189
" Motor Buses	" 31	339	295	— 44	52	39.260	— 3,589
Derby Corporation ..	April 1	2,609	1.960	— 649	52	110,918	— 8,662
Dundee City ..	" 5	3,301	2.885	— 416	46½	146.485	+ 3,589
East Ham Corporation	" 8	2,178	2.156	— 22	1½	2 555	+ 69
Edinburgh Corp. Trys.	" 1	..	11.147	..	46	572.704	— 40,212
" Motor Buses	" 1	..	3.185	..	46	161.530	..
Glasgow Corporation ..	" 8	47,552	44.878	— 2.674	44½	2,009 038	— 5,314
Glossop (U.E. Sup. Co.)	" 8	225	211	— 14	14	3.164	— 151
Halifax Corporation ..	" 4	3,656	2,376	— 1,280	¾	2,376	— 1.280
" Motor Buses	" 4	93	32	— 61	¾	32	— 61
" Railless Cars	" 4	..	33		¾	33	...
Huddersfield Corporatn.	" 1	6.665	4 939	— 1,726	1	4,939	— 1,726
Ilford U.D. Council ..	" 1	1.482	1.434	— 48	52	77,687	+ 9,814
Ipswich Corporation ...	" 8	867	758	— 109	1	890	— 133
Isle of Thanet ..	" 5	805	562	— 243	26½	15,973	— 13
Kilmarnock Corporat'n	Mar. 25	374	304	— 70	44½	15 914	— 685
Leicester Corporation..	April 8	6 401	7,172	+ 771	14	99 846	+ 8.133
Liverpool Corporation	" 1	30 854	28,679	— 2.175	13	373 842	+ 5.127
London County Ccl. ..	" 5	103 424	92,244	— 11.180	52½	5,072.663	+ 157,752
Maidstone Corporation	" 6	894	788	— 106	½	788	— 106
Manchester Corp. ..	Mar. 31	31.335	29.436	— 1,899	52	1,998,403	+ 174,752
Newcastle-on T. Corp.	April 8	11 077	9 614	— 1,463	1	9,614	— 1.463
Nottingham Corp. .	" 6	7.630	6.481	— 1,149	½	6 481	— 1,149
Oldham Corporation ...	" 5	5 046	4 378	— 668	1	5.895	+ 1,644
Preston Corporation ...	" 5	1,701	1,264	— 437	½	1,264	— 437
" Motor Buses	" 5	..	92	..	½	92	..
Reading Corporation ..	Mar. 30	1.752	1,445	— 307	52	81.525	— 4.350
" Motor Buses	" 30	387	278	— 109	52	17.361	+ 3,481
Rotherham Corporation	April 3	2 640	2.121	— 519	52	117,185	— 22,139
Salford Corporation ..	" 9	10.400	9 883	— 517	1½	12.708	+ 1.543
Sheffield Corporation..	" 2	22.111	17.884	— 4.227	52½	1,003.402	— 80,739
Southampton Corp. ..	" 5	2,796	1,926	— 870	½	1,926	— 870
" Motor Buses	" 5	80	71	— 9	½	71	— 9
Southend-on-Sea Corp.	Mar. 31	296	565	+ 269	52	126 014	+ 7,750
South Shields Corp. ..	" 31	1,391	1,267	— 124	52	88,183	— 12,704
St. Helens Corporation	April 4	1.169	893	— 276	½	893	— 276
Sunderland Corp. ..	" 9	4 051	3,204	— 847	1	3,204	— 847
Swindon Corporation..	" 5	417	335	— 82	½	335	— 56
Tyneside Trys., Trds...	Mar. 29	2,386	820	— 1,566	13	9 916	— 5.839
Wallasey Corp. ..	April 1	2,978	2,333	— 645	52½	142.761	+ 6,300
" Motor Buses	" 1	237	191	— 46	52½	12 117	+ 3.285
Walsall Corporation .	Mar. 31	1.645	1,252	— 393	52	85 116	— 9.976
" Motor Buses	" 31	1 200	629	— 571	52	48.470	— 13,753
Walthamstow U.D.C...	April 8	2 013	1.771	— 242	1½	2,143	— 264
Warrington Corp. ..	" 6	1.034	975	— 59	1	975	— 59
West Ham Corp. ..	Mar. 30	6.649	5 428	— 1,221	52	204.762	— 730
Wolverhampton Corp.	April 5	1.993	1.657	— 336	1	1,657	— 336
" Motor Buses	" 5	546	506	— 40	1	506	— 40

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1920-21.	1921-22.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	April 8	£80,859	85,650	14	£1,168.324	+ 52,273
Ballarat & Ben. (4 wks.)	Jan.	4.594	4 805	44	50,657	+ 3.120
Brazilian Traction (Mlrs)	Feb.	11,941.000	14,473,000	8	29,505.000	+ 4,689.000
Brisbane	Mar.	46.300	51,300	13	143.890	+ 8.105
British Columbia $	Feb.	838.682	821.828	34	6,921.985	+ 157,547
Buenos Aires Lacroze ..	Mar.	59.365	61,775	39	521.819	+ 11,105
Burmah Tr. & Lght. Rs.	Feb.	48.405	52,880	8	403,127	+ 45,959
Calcutta .. Rs.	April 8	87,417	112.650	14	1,485 061	+ 590,169
Cape Town	Feb.	..	26 980	..	..	..
Carthagena & Herrerias	Mar.	2.226	2,145	12	7.993	— 949
Cordoba	Jan.	18,696	22 152	43	230 068	+ 32,934
East India	Mar.	4.108	4 446	34	34.017	— 410
Kalgoorlie ..	Dec.	3,140	2 814	52	27,758	— 9.054
La Plata ..	Mar.	*3,403	7.067	13	20,109	+ 9 471
Madras (2 weeks) Rs	Mar. 31	56.919	47.773	13	291.232	+ 145.588
Manila .. .. $	Feb.	305.389	310.001	8	619 253	— 8.585
Montevideo	Mar.	48,925	51,158	21	231 459	— 9,229
Para	Feb.	20.545	21,582	13	67,203	— 1,821
Pernambuco	April 9	3,953	3.498	14½	52,415	— 12,763
Port Elizabeth	Feb.	..	6 690	..	..	
Rangoon .. Rs	Feb.	120,718	130,583	8	268,433	+ 25.157
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,940
Singapore .. $	Feb. 25	12,797	13,535	8	122 295	+ 34.805
Winnipeg $	Feb.	460.125	498 577	8	1,005.624	+ 39 270

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

Common Fund Companies.		
Metropolitan District Rly. Co. ..	Week ending April 8, 1922 ..	£215.020
London Electric Rly. Co.	Corresponding week last year ..	239.225
City & South London Rly. Co. ..	Decrease	24 205
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	2,957.108
London General Omnibus Co., Ltd.	Corresponding period last year ..	3 211.202
	Decrease	254.094
London & Suburban Traction Group	Week ending April 8, 1922 ..	£46 873
Metropolitan Elec. Tramways, Ltd.	Corresponding week last year ..	54 007
London United Tramways, Ltd.	Decrease	7.134
South Met. Elec. Tr. & Ltg. Co., Ltd.	Aggregate from Jan. 1 to date ..	643 421
Tramways (M.E.T.) Omnibus Co., Ltd	Corresponding period last year ..	709 255
Gearless Motor Omnibus Co., Ltd.	Decrease	65 834

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending April 8, 1922 ..	732 533	3.781	36 314
Total Receipts (14weeks) ..	458 575	53.584	512.159
MERSEY RAILWAY			
Week ending April 8, 1922 ..	—	—	4.947
Total Receipts (14weeks) ..	—	—	66 386

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THE
Tramway AND Railway World
FOUNDED IN 1892.

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LONDON, APRIL 22, 1922.

WHEN EXPENSE IS ECONOMY.

It is much to be desired that those responsible for the direction of British tramways should familiarise themselves with work that is being done elsewhere. They will thus acquire wider knowledge of the possibilities of tramway enterprise and, what is equally important, they will learn to avoid some useless innovations by observing their results in practice. It is surprising how few members of tramway committees have anything like a general acquaintance with tramway matters beyond their own locality; and to this fact must be largely attributed the slow adoption of improvements that have been made use of with success in individual undertakings. During the past six or seven years conditions have been so abnormal that much progress in technical equipment has been out of the question, and consequently there are large arrears to be overtaken. The time is consequently opportune for investigations to be made as to what is being done both in this country and abroad. Tramway committees should see to it that their managers and engineers have the fullest practicable opportunity to travel and inspect equipment and methods of working. Parsimony in this direction is in reality foolish extravagance. It would well repay any corporation to insist upon its chief tramway officers making tours of inspection once in every three or four years. The wider vision they would thus acquire and the practical knowledge they would bring back with them would be of great service in the conduct of their undertakings. Municipal authorities may wisely follow the example in this respect of some of the larger traction companies both at home and abroad who systematically send their principal officials on tours of inspection. They regard the expense as money well spent; and there is no doubt that they are right. The difficulty is that in the case of corporations no one is responsible for shaping policy beyond the immediate future, and consequently no one takes the initiative in such matters as this. The manager does not care to press the matter, the chairman seldom feels called upon to do so, and so nothing is done. What is wanted is some means of arousing more active interest in the minds of committee members in the undertakings for which they are responsible. Tramway enterprise is to-day face to face with increasing competition. It cannot stand still. If it is to survive and expand, every improvement, wherever made, must be investigated and utilised whenever the opportunity offers.

THE INSTITUTE OF TRANSPORT.

A WORLD TRANSPORT CONGRESS.

Mr. H. E. Blain, C.B.E., honorary secretary of the Institute of Transport, has issued a programme of a Congress to be held by the Institute in London from May 17 to 20. Delegates are expected from the British Dominions, the United States of America, and the Continent. Papers will be read and discussed at meetings to be held on the mornings of the first three days at the Institution of Civil Engineers, Great George Street, Westminster, and a lecture to graduates and students will be delivered at the rooms of the Royal Society of Arts, John Street, Adelphi, W.C.2, on May 19. The afternoons of the three days and the Saturday following will be devoted to visits of inspection.

The Lord Mayor of London (Alderman Sir John J. Baddeley) has invited the delegates to a conversazione at the Mansion House on the evening of May 17, and the third dinner of the Institute will be held on the following evening. Subject to limitations of accommodation, each member attending the congress may invite one visitor to meetings and visits. Ladies accompanying the delegates and visitors may attend the Mansion House conversazione and the Institute dinner. The headquarters of the congress will be at the Hotel Metropole, Northumberland Avenue, London, W.C.

The programme is as follows:—

TUESDAY, MAY 16.

7 to 10 p.m.—Reception by the President (Sir Henry P. Maybury, K.C.M.G., C.B.), at the Hotel Metropole.

WEDNESDAY, MAY 17.

9.30 a.m.—The President will open the Congress.
10 a.m.—"Recent improvements in transport facilities in the Port of London." By Sir Cyril Kirkpatrick.
11.15 a.m.—"Wireless as an aid to transport." By Captain M. H. P. Riall Sankey, C.B., C.B.E.
10 a.m.—"The design, construction and maintenance of highways in relation to the development of mechanically propelled vehicular traffic." By Col. C. H. Bressey, O.B.E.
8 to 11 p.m.—The Lord Mayor of London will entertain the Congress at a conversazione at the Mansion House.

THURSDAY, MAY 18.

10 a.m.—"Inland water transport—a practical policy." By Mr. Neville Chamberlain, M.P.
10 a.m.—"The future design of road vehicles for passenger and goods services." By Sir J. E. Thornycroft, K.B.E.
7 p.m.—Dinner of the Institute.

FRIDAY, MAY 19.

10 a.m.—"The Finance of the modern highway—a problem and a solution." By Mr. Dixon H. Davies.
10 a.m.—"Foreign railway practice." By Prof. J. Carlier.
11.15 a.m.—"'Safety' in railway operation." By Col. J. W. Pringle, C.B.
5 p.m.—"The operation of heavy suburban passenger services on a steam railway, with particular reference to the density of service, terminal and other facilities." By Mr. F. V. Russell, C.B.E. (This paper will be read at the rooms of the Society of Arts.)

Inquiries should be addressed to Mr. H. E. Blain, C.B.E., honorary secretary, Institute of Transport, 15, Savoy Street, Victoria Embankment, London, W.C.2.

"KEEP TO THE LEFT'

To the Editor of THE TRAMWAY AND RAILWAY WORLD.

SIR,—Your leader in your issue of April 15 should be of material assistance in directing attention to the desirability of altering the custom of the footpath from "Keep to the right" to "Walk on the left." There is, however, a chronological error in your reference "quite recently the London 'Safety First' Council decided to recommend the new rule to all London municipal authorities." As a matter of fact, this Council first took up the matter at the commencement of 1917, and it was because of the importance of the evidence which we had secured that I subsequently supported Mr. Dalrymple's effort to induce the Municipal Tramways Association to join in the movement.

His paper was successful in this respect, and now that the Association of Municipal Corporations, the County Councils Association, the Urban District Councils Association, and the Rural District Councils Association, together with the Ministry of Transport, have all expressed themselves in favour of the change, it is hoped that a strenuous effort may be made throughout the country to do away with one of the most prolific of the causes of street accident. The recent resolution of the London "Safety First" Council to which your leader refers was a suggestion to the London municipal authorities, who, as far back as 1917, expressed their agreement with the change, to exhibit public notices from a uniform date, viz., July 1 next.—Yours very truly,

H. E. BLAIN,
Joint Hon. Secretary.

Safety First Council,
15, Savoy Street, W.C.2.
April 19, 1922.

*** The paragraph to which Mr. Blain refers was not, of course, a history of the "Keep to the left" movement, and we did not intend to imply that the recent resolution of the "Safety First" Council was their initial move in this matter. The facts are well known to every one interested. The essence of the concluding paragraph in the above letter was, in fact, contained in a paragraph under "Miscellaneous News" in our issue of April 15.

Bradford Stipendiary and Stationary Tramcars.—In fining a chauffeur for driving a motor car in a dangerous manner, the Bradford Stipendiary said it was of the utmost importance when a tramcar was stationary, taking on or discharging passengers, that if a motorist chose to pass on the near side he should take extreme care to avoid an accident. Otherwise he would be held responsible. The proper and safe thing to do was to stop where there was a stationary car.

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CROYDON CORPORATION TRAMWAYS.

QUESTION OF FUTURE WORKING.

Croydon Town Council have now received the report on the Corporation tramway undertaking which was prepared at their request by Mr. J. Dalrymple (general manager of Glasgow Corporation Tramways), and Mr. R. J. Howley, M.Inst.C.E. The report states that to reconstruct the present system and continue to work it as hitherto would result in a net loss to the ratepayers of some £18,000 a year. "We cannot recommend railless trolley omnibuses as suitable to the conditions at Croydon. Motor omnibus powers within the borough would only be useful in substitution of local services which are reasonably profitable. We do not think powers could be obtained to work motor omnibuses outside the borough."

The report expresses the opinion that the service on the London Road from Croydon to Purley should be a through service from London, and could best be given by the L.C.C. tramways. Such a service would be of considerable value to the L.C.C. by reason of the traffic which it would induce on their own undertaking. Should through running on the London Road be arranged with the L.C.C., Mr. Dalrymple and Mr. Howley recommend the Corporation to close their undertaking and to arrange for the working of the local services by the L.C.C. or by the South Metropolitan Tramways Company, or partly by one and partly by the other. Should through running not be arranged with the L.C.C. they recommend that negotiations should be opened with the Underground group to provide for an adequate service of omnibuses between London and Purley, and the working by the South Metropolitan Company of the local services from Thornton Heath and Addiscombe to Crown Hill and from West Croydon to Penge. Any arrangement come to with the L.C.C. and/or the company or companies should be on the basis that the rental paid should free the Corporation from cost in respect of maintenance and capital charges.

The rolling stock, though becoming obsolete, the report states, has many years of life left. The rails from Norbury to Purley are worn out with the exception of short lengths where new rails have been laid, and are no longer of use value. The rails on the branch routes have still a few years' use value. The estimated cost of reconstructing the tramway permanent way during 1922-1926 is £216,012, and estimating interest and sinking fund at about 10 per cent. a year, the annual amount to be provided would be £21,601 a year. Cost of reconstructing the overhead line for central running should not exceed £5,000 if the existing poles are used as far as possible. A sum of £12,000 should be allowed for remodelling Thornton Heath depot. It is estimated that with the reconstructed system worked as at present there would be an annual deficit of £18,746. Traffic estimates on the basis of a through service of L.C.C. cars to Purley are given, which show that there would be a yearly deficit of £8,436. If the London County Council provided the Norbury to Croydon service, and the Thornton Heath service was curtailed at Croydon, 34 cars could be sold and the Purley shed disposed of. It is estimated, however, under such an arrangement there would be an annual deficit of £5,141.

The report is being considered by a special committee who will submit their recommendations to the Council on May 8.

STREET ACCIDENTS.

LARGE INCREASE IN 1921.

A considerable increase in the number of accidents caused by vehicles in public highways throughout the country is recorded in the annual return compiled by the Home Office. The figures for 1921—the highest on record—compared with certain preceding years, are as follows:—

	Killed.	Injured.	Total.
1909	1,151	16,872	18,023
1913	2,099	42,544	44,643
1918	2,193	35,732	37,925
1919	2,628	48,698	51,326
1920	2,837	54,910	57,747
1921	2,845	61,272	64,117

Tramcars and omnibuses were responsible for considerably fewer accidents, while those attributable to other motor vehicles and pedal cycles largely increased. The following is an analysis of the figures:—

	1921.		1920.	
	Fatal.	Non-fatal.	Fatal.	Non-fatal.
Horse-drawn vehicles	326	6,318	370	7,112
Motor-omnibuses	179	2,087	189	2,172
Electric tramcars	106	5,116	196	6,430
Motor-cars, Motor-vans, etc.	2,029	35,426	1,908	29,742
Pedal cycles	205	12,325	174	9,454

In the Metropolitan Police district last year there were 571 fatal and 22,647 non-fatal accidents, and in the City of London ten persons were killed and 706 injured. Of the deaths in the whole area, including the City, 65 were caused by horse-drawn vehicles, 57 by omnibuses, 31 by tramcars, 408 by motor-cars, motor-vans, etc. and 20 by pedal cycles. The 23,353 cases of injury were attributable as follows: Horse-drawn vehicles, 2,473; omnibuses, 1,492; tramcars, 2,135; motor-cars, motor-vans, etc., 11,860; pedal cycles, 5,393.

London-Paris Air Service.—The Secretary of State for Air has given some particulars of the British subsidised London-Paris air service. Nearly 6,000 passengers were carried during the year just ended by nearly 1,100 machine voyages, and there was not a single fatal accident. The comparable figures of the French Paris-London air service were 1,600 machine voyages carrying 4,500 passengers.

RAILLESS CARS FOR BIRMINGHAM.

PROGRESS OF THE CORPORATION BILL.

The Birmingham Corporation Bill, which includes clauses relating to railless trolley vehicles, tramways and omnibuses, came before the Local Legislation Committee of the House of Commons last week. The clauses alluded to were unopposed.

Mr. Tyldesley Jones, K.C., said the Corporation were faced with the question whether they were going to spend a large sum of money on re-constructing the Nechells tramway route, or were going to provide an alternative method of transport. The promoters asked that they should be authorised to run trolley vehicles over the route. Mr. Erskine, for the Ministry of Transport, said the proposed trolley vehicles were more of the nature of tramways than motor omnibuses, and the Ministry thought that the promoters, in seeking to extend the trolley vehicle system, should proceed by Provisional Order. Mr. Tyldesley Jones said the Corporation sought powers to run trolley vehicles anywhere. He suggested that the powers under the Bill should be confined to the routes on which the Corporation were running tramways to-day, and that, in the event of powers being sought to run trolley vehicles elsewhere, they should have to apply for powers by Provisional Order. Mr. Erskine assented.

Mr. A. Baker (general manager of the Corporation tramways) gave evidence in support of the tramway clauses. He stated that the cost of reconstructing the Nechells route was estimated at £90,000. The tramway clauses were agreed to.

REGULATION OF ROAD VEHICLES.

DEPARTMENTAL COMMITTEE'S RECOMMENDATIONS.

The Departmental Committee on the Taxation and Regulation of Motor Vehicles has issued a second interim report to the Ministry of Transport (price 3s.). It consists of 84 pages, 13 ins. by 8 ins., is provided with an excellent index, and will no doubt form the basis of legislation introducing many much-to-be-desired changes in the regulation of motor traffic. The first interim report was presented on March 31, 1920, and dealt with the question of taxation and revenue. The second report covers matters included in the second portion of the reference.

MISCELLANEOUS NEWS AND NOTES.

Bolshevik Tramway Fares.—It is reported that tramway fares in Moscow have again been raised, and that "it now costs 75,000 roubles to go from one station to another."

Sheffield Tramways Extension.—The Ecclesall extension of Sheffield Corporation Tramways has been put into use, and the cars now run beyond the old terminus at Banner Cross to the top of Millhouses Lane (Silver Hill). The extension serves a new housing area.

Effort to End Sunderland Strike.—With a view to settling the strike of employees of the Sunderland District Electric Tramways, Ltd., which commenced on February 2, Alderman Robert Richardson, M.P. for the Division, has asked both parties to meet him in conference.

Proposed Track Reconstruction at Dundee.—The general manager and engineer of Dundee Corporation Tramways (Mr. W. T. Young) has reported that an expenditure of £59,000 on track reconstruction and rail hardening is desirable. The matter has been referred to a special committee.

New Cars at Gateshead.—The Gateshead and District Tramways Company recently put into service five new single-deck cars of very roomy proportions and pleasing design. It is understood that seven additional double-deck top-covered cars will shortly supplement the company's rolling stock.

Railless Traction Acts.—The Minister of Transport has extended the period of the Western Valleys (Mon.) Railless Electric Traction Act of October, 1913, for the completion of the trolley omnibus equipment for one year from February 15, 1922, and the period allowed by the Western Valleys Railless Electric Traction (Extension) Order, 1914, for one year from July 8, 1922.

Penny Fares Not Favoured at Bradford.—Mr. R. H. Wilkinson, general manager of Bradford Corporation Tramways, reported against a proposal to re-introduce penny fares, and stated that the present 2d. minimum is the main source of revenue. "It brings in 57 per cent. of the total passenger receipts," he said, "and any alteration thereto would seriously jeopardise the stability of the undertaking."

The International Tramway Union has issued a report in French of the meeting held in Brussels on February 18, 1922, when, as mentioned in our issue of April 15, the Union was reconstituted, the membership being limited to representatives of Entente and neutral countries. The articles of the new association have now been printed in French, and copies may be obtained from M. H. Camp, the general secretary, 23, Rue d'Arlon, Brussels.

Presentation to Veteran Liverpool Tramway Man.—A presentation was recently made at the Lambeth Road Carriage Works of Liverpool Corporation Tramways to Mr. Robert Bulman on the occasion of his retirement after over 40 years' service with the city tramways, including 15 years with the old tramways company. The general manager (Mr. P. Priestly) handed to Mr. Bulman a gold watch, chain and pendant and gold sleeve links, with a silver chain bag for Mrs. Bulman. Mr. Priestly referred to the fact that Mr. Bulman had had the unique experience of assisting in the building of practically every type of tramcar since their inception in this country.

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Reduction of Wolverhampton Tramways Minimum Fare.—Wolverhampton Tramways Committee have recommended that the present 2d. minimum fare be reduced to 1½d. The tramways general manager and engineer (Mr. C. O. Silvers) estimates that were the 2d. minimum retained there would be a credit balance of £8,438, but with the 1½d. minimum there would be a deficit of £3,562. The committee consider that they are justified in this recommendation only by the over-riding necessity to make every possible contribution to a further fall in the cost of living. The Town Council have confirmed the Committee's recommendation.

The Institute of Municipal and County Engineers.—A meeting of this institution for the eastern district will be held at Chiswick on April 29. Members will assemble at the new Chiswick works of the London General Omnibus Company at 10.30 a.m., and after inspection there will be a meeting in a hall in the works. After luncheon the members will visit the junction of the future Surrey arterial road with the Chiswick High Road (Great West Road), and subsequently a motor garage recently erected by direct labour will be inspected, also the site of the future river promenade and some open spaces at Chiswick, etc.

Southport Tramways and Omnibus Proposal.—A special subcommittee of Southport Tramways Committee which has been considering the advisability of running motor omnibuses, report that it is undesirable to substitute omnibuses for the present tramway service, owing to the heavy expenditure required for omnibuses, the extra capital and maintenance cost on the roads as compared with the present maintenance of the tramway track, and the loss to the electricity undertaking in revenue. There were no districts in the borough, the sub-committee added, where it would at present pay to run omnibuses as an adjunct to the tramway system. The Town Council deferred consideration of the report for a month.

Omnibus Driver Sent to Prison.—A motor omnibus driver was charged at Bromley police court on April 18 with being drunk while in charge of an omnibus on Mason's Hill, Bromley, on Bank Holiday and with driving in a manner dangerous to the public. A police constable reported that on Bank Holiday evening he saw an omnibus coming down Mason's Hill at a speed of about 25 to 30 miles an hour. Some of the passengers were standing up on the top and some were screaming. The omnibus pulled up at Bromley South Station with a jerk. The constable ordered the driver to leave the omnibus and then saw that he was drunk. The prisoner denied this and said that he was driving at the ordinary speed. The magistrate sentenced him to 14 days' imprisonment in the second division.

Vehicle Building Workers' Agreement.—An important agreement was ratified on Thursday between the employers connected with the vehicle building industry and the Union of Vehicle Builders, the Society of Wheelwrights and Smiths, and the Woodcutting Machinists. The agreement will remain in force until March 1, 1923. The principal provisions are :—Towns graded according to industrial importance : skilled men in Grade 1 to suffer a reduction of 3d. per hour, in two instalments, the first of 1½d. on May 1 and the second on September 1 ; workers in Grade 2 towns to receive 1d. below minimum for Grade 1 towns, and workers in Grade 3 towns to be similarly reduced ; forty-seven hour week to continue, unless extended in the engineering trade ; overtime paid at special rates ; payment by results may be introduced by agreement.

New Huddersfield Omnibus Service.—Huddersfield Corporation opened its new omnibus service from Honley to Holmfirth and Holmebridge on April 15, when the members of the Huddersfield Tramways Committee, Mr. A. A. Blackburn, the general manager, and members of the tramway staff travelled by the new omnibus from the tramways office to Holmfirth, where they were joined by the chairman, Councillor G. H. Tinker, and other members of the Holmfirth Urban District Council. Councillor Tinker, in welcoming the representatives from Huddersfield, said that they were inauguarating a service which was bound to be a benefit to both communities. The new omnibuses of the Huddersfield Corporation were a credit to Huddersfield, and they provided an excellent means of seeing the beautiful country through which they passed. They all regretted that the late chairman of the Tramways Committee (Alderman Sellers), had not lived to see the inauguration of the service. The new omnibuses have been supplied by Kerrier Motors, Ltd., of Huddersfield.

Mr. J. B. Hamilton and His World Tour.—Mr. J. B. Hamilton, general manager of Leeds Corporation Tramways, whose return from a tour round the world was noted in our issue of April 15, mentioned in a local interview that, in the course of his travels, he had seen all the systems of transport in the Northern Hemisphere. Everything pointed to a still greater development of electric traction. "Railless cars," he said, "are being largely used in Shanghai, where they are to be still further exploited, and the same form of traction is extending in various parts of America." New York had an excellent service of motor omnibuses, the vehicles being of the same type as those running in London. In America generally, he said, the tramways are suffering from the same disabilities that afflict British concerns, especially high costs of operation, which have gone up in an even greater ratio than in this country. In the United States some of the tramway systems with fixed tariffs were in the hands of receivers. The one place above all others where there has been no development in transport was Pekin. The streets were planned some 500 years ago, he believed, and they were on lines which would delight the hearts of our modern city engineers, but the methods of transport were the same as when the place was laid out, and probably for 500 years before that.

Proposed Fare Reduction at Manchester.—Manchester Corporation Tramways Committee on Wednesday recommended the City Council to make a reduction in tramway fares by increasing the length of the existing penny stages. The committee originally had before them a proposal by the general manager (Mr. J. M. McElroy) that the reduction should be made on two routes only, as an experiment. Mr. McElroy suggested that the penny stages should be lengthened from a mile and a quarter to a mile and a half for a period of two months. It was ultimately decided, however, that the trial should apply to all routes. If the test proves sucesssful, tramway fares in Manchester will revert to the level at which they stood before the last increase was made. On the journey from the city to Heaton Park, Middleton or Withington, for instance, there will be a reduction of a halfpenny on the present fare. It is understood that some of the fares will be reduced on May 8 and those on other routes shortly afterwards, if the recommendations of the committee are confirmed. The accounts presented to the committee on Wednesday showed an approximate expenditure for the year ended March 31 last of £1,994,551, or £43,449 less than the estimate. The estimated revenue for the current year was £1,894,495—a reduction on last year, in view of the probable loss on the new fares, of approximately £100,000. The Tramways Committee decided to allocate £50,000 to the relief of rates.

PERSONAL.

Mr. Charles Collinge, permanent way superintendent of Coventry Corporation tramways, has been presented by the staff with a suit case on leaving for Rochdale.

Major-General Sir Frederick H. Sykes, G.B.E., K.C.B., C.M.G., has been appointed a director of the Underground Electric Railways Company of London, Ltd., the London General Omnibus Company, Ltd., and the Associated Equipment Company, Ltd.

Mr. G. J. Shave, chief engineer and operating manager to the London General Omnibus Company, prevented an accident at Chiswick on Tuesday by stopping a horse which bolted while drawing a van. The driver was lying, apparently in a fit, across the dashboard. Mr. Shave was dragged some distance.

Mr. J. K. Bruce, traffic manager of the London County Council tramways, read a paper at the rooms of the Royal Society of Arts, Adelphi, London, W.C., yesterday to the students and graduates of the Institute of Transport on "The operation of a large tramway undertaking, with reference to capacity and costs under given conditions."

Councillor H. Salmon, the manager of the Expanded Metal Company, whose works are at West Hartlepool, has been appointed chairman of the West Hartlepool Tramways Committee in place of Alderman R. Martin, who, owing to failing health, resigned from the Tramways and Electricity Committee. Alderman R. Martin, J.P., who has been a member of this local governing body for the last 23 years, occupied the chief civic chair for two years, 1911 and 1912, and held the chairmanship of the Tramways Committee for nine years.

Mr. Ernest Benedict.—The London Shipping Orchestral Society will give a subscription concert at Caxton Hall, Westminster, on Wednesday evening, April 26, and they have announced that the proceeds, after deducting expenses, will be devoted to the fund which is being raised for Mr. Ernest Benedict, son of the musician, the late Sir Julius Benedict, who has lost his sight at the age of 83. Tickets may be obtained from Mr. Clive Parsons, honorary conductor, 149, Fenchurch Street, and Mr. John Farmer, Syren and Shipping, 93, Fenchurch Street, E.C.3. The artistes will include Miss Annie Rees, Mr. Mark Hambourg and Mr. Randall Jackson.

FINANCIAL.

Middlesbrough Tramways Deficit.—There was a deficit of £26,000 on the working of Middlesbrough Corporation tramways for the year ended March 31, 1922.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended April 19 amounted to £91,925, a decrease of £3,689 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152.26 a year ago. From April 1 (the commencement of the financial year), to April 19 (2¾ weeks), the total receipts were £249,752, a decrease of £22,323 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended April 8 give total receipts of £357,705, or £38,616 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £183 12s. 6d. per mile of single track, and last year at the rate of £203 9s., thus showing a decrease for the week of £19 16s. 6d. per mile open. Of 52 undertakings, all except three show a decrease in earnings on the week as compared with the corresponding week a year ago. The three exceptions are Burnley, Bury and Leicester.

Greenock and Port Glasgow Tramways Company.—The annual report shows that after providing for all expenses chargeable to revenue, including £2,377 for mortgage interest, amounts payable under agreements with corporations amounting to £1,479, and setting aside £15,675 for renewals, there is a surplus on year's working of £7,482, making, with £410 brought forward, £7,893, which directors propose should be appropriated as follows :—To sinking fund for loan redemption, £1,796 ; to reserve, £1,000 ; to dividend of 5 per cent. on preference shares for the year to December 31 ; balance to be carried forward, £1,597.

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THE POWER AND TRANSPORT FINANCE COMPANY

This company was registered on Thursday with a capital of £250,000. The object is to combine the technical resources of a number of well-known firms for the purpose of investigating engineering projects and rendering financial aid where desirable. The following is the board of directors :—

Mr. W. L. Hichens (chairman of Cammell Laird & Co.).
Sir John Hunter (managing director of Messrs. Arrol & Co.).
Lord Meston and Mr. P. J. Pybus (directors of the English Electric Co.).
Sir Hugh Reid (managing director of the North British Locomotive Co.).
Mr. John Sampson (director of John Brown & Co.).
Sir George May (secretary, Prudential Assurance Co.).

The Finance Company will facilitate the obtaining of large contracts which will afford employment for some or all of the companies represented, and at the same time relieve them individually of financial responsibility for accepting payment to a greater or less extent in the form of securities.

BUSINESS NOTES.

Messrs. Leo Swain & Company, Ltd., 237, Deansgate, Manchester, are placing agencies for the Luchard air compressor plants, and anyone desirous of taking up this agency should communicate with them.

The Shrewsbury S.T. and Challiner Tyre Company, Ltd., have decided, owing to the political situation in Ireland and the retirement of the late manager, Mr. F. C. Johnston, to work the northern area direct from Manchester. Mr. J. G. Rawson, who has taken up the duties of representative and resident manager in Dublin, will carry on as hitherto the existing fitting depot and offices at Lincoln Chambers.

Nobel Industries, Ltd., of Nobel House, S.W.1, have notified the Board of Trade that they propose to support the British section, which is being organised by the Department of Overseas Trade, in the Rio de Janeiro Exhibition, which opens on September 7 next. They will exhibit a range of products similar to those now installed for the inspection of visitors at the British and Latin American Chamber of Commerce, 39, Bedford Square, London, W.C.1.

CONTRACTS

Manchester Corporation have accepted the tender of Walter Scott, Ltd., for steel girder tramway rails.

Cravens Railway Carriage and Wagon Works have an order from Edinburgh Corporation for tramcar top covers.

Sheffield Corporation proposes to ask for sanction to borrow £30,000 for the construction of a garage for electric vehicles and the equipment of the cleansing depot.

Wolverhampton Electricity Committee have accepted the tender of the Stirling Boiler Company for two 40,000 lbs. water tube boilers, and that of the Underfeed Stoker Company, Ltd., for four mechanical stokers.

Islington Cleansing Committee have recommended the purchase of four 2½-ton electric vehicles for refuse collection from the General Vehicle Company, Ltd., at a total cost of £5,200, and a 4-ton petrol lorry from Commercial Cars, Ltd., at a cost of £877.

Calcutta Electricity Supply Corporation is reported to have placed several contracts under a Trade Facilities Act guarantee to the amount of £250,000. Among the contracts are the following :— English Electric Co., Ltd., 15,000 kw. turbo-generator ; Stirling Boiler Co., Ltd., boilers ; British Thomson-Houston Co., Ltd., transformers ; W. T. Henley's Telegraph Works, cables.

POSITIONS VACANT.

COUNTY BOROUGH OF GREAT YARMOUTH.

TRAMWAYS MANAGER.

Applications are invited for the post of Tramways Manager (engineer preferred) to take entire charge of the Corporation's Tramway Undertaking, outside the power station, with the exception of the maintenance and control of the overhead electrical equipment. Salary, £400 per annum. Canvassing is prohibited.

Applications, which should state experience in permanent way work and be accompanied by a copy of three testimonials, must reach me not later than noon on Tuesday, May 2.

W. EDGAR STEPHENS,
Town Clerk.

Town Hall, Great Yarmouth.
April 20, 1922.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	April 12	3,668	3,346	— 322	45¾	159,076	— 13,889
„ Motor Buses	„ 12	59	140	+ 81	45¾	10,143	+ 8,596
Ayr Corporation ..	„ 15	585	506	— 79	48	32,884	— 2,822
Barrow Corporation ..	„ 15	863	594	— 269	2	1,173	— 564
Belfast City	„ 14	12,953	12,142	— 811	2	24,128	— 1,457
Birkenhead Corporation	„ 19	2,554	2,433	— 121	2¾	5,593	— 612
„ Motor Buses	„ 19	478	682	+ 204	2¾	1,420	+ 169
Birmingham Corporat'n	„ 8	30,808	28,624	— 2,184	1	33,990	— 7,053
„ Motor Buses	„ 8	2,011	1,681	— 330	1	2,013	— 762
Blackburn Corporation	„ 5	2,613	2,231	— 382	1¼	3,302	— 1,464
Bradford Corporation..	„ 8	13,745	13,157	— 588	2	16,185	— 2,917
Burnley Corporation ..	„ 15	2,946	3,784	+ 838	..	..	..
Burton-on-Trent Corp.	„ 16	632	563	— 69	2	1,234	— 190
Bury Corporation ..	„ 16	2,570	2,674	+ 104	2¼	5,648	— 708
Chatham & District ..	„ 13	1,713	1,602	— 111	15	21,683	— 2,904
Chesterfield Corporat'n.	„ 10	2,228	1,865	— 363	1	1,865	— 363
Derby Corporation ..	„ 15	2,213	2,115	— 98	2	4,625	— 807
Dundee City ..	„ 12	3,351	2,848	— 503	47¾	149,334	+ 3,086
East Ham Corporation	„ 15	2,178	2,186	+ 8	2¼	4,741	+ 77
Edinburgh Corp. Trys.	„ 8	..	11,565	..	47	584,270	— 41,220
„ Motor Buses	„ 8	..	3,249	..	47	164,779	..
Glasgow Corporation ..	„ 15	47,782	43,758	— 4,024	45¼	2,052,796	— 10,090
Glossop (U.E. Sup. Co.)	„ 15	234	258	+ 24	15	3,422	— 127
Halifax Corporation ..	„ 11	3,988	3,887	— 101	1½	6,263	— 1,380
„ Motor Buses	„ 11	96	59	— 37	1½	90	— 100
„ Railless Cars	„ 11	..	41	..	1½	74	...
Huddersfield Corporatn.	„ 15	5,033	4,986	— 47	3	14,856	— 1,923
Ilford U.D. Council ..	„ 15	1,501	1,536	+ 35	2¼	3,295	+ 131
Ipswich Corporation ...	„ 15	832	861	+ 29	2	1,751	— 119
Isle of Thanet ..	„ 12	681	627	— 54	27½	16,603	— 67
Kilmarnock Corporat'n	„ 15	357	319	— 38	47¾	16,855	— 849
Leicester Corporation..	„ 15	6,385	7,540	+ 1,155	15	107,387	+ 9,236
Liverpool Corporation	„ 15	28,258	27,956	— 302	15	430,498	+ 3,544
London County Ccl. ..	„ 19	95,614	91,925	— 3,689	2¾	249,752	— 22,323
Maidstone Corporation	„ 13	458	426	— 32	1½	1,214	— 138
Manchester Corp. ..	„ 15	37,851	36,212	— 1,639	2	79,361	— 2,717
Newcastle-on-T. Corp.	„ 15	10,978	9,567	— 1,411	2	21,309	— 2,594
Nottingham Corp.	„ 13	7,357	7,875	+ 518	2	14,357	— 631
Oldham Corporation ...	„ 16	4,592	4,733	+ 141	3	15,007	— 1,479
Preston Corporation ...	„ 12	1,961	1,724	— 237	1½	2,988	— 674
„ Motor Buses	„ 12	..	128	..	1½	220	..
Reading Corporation ...	„ 13	1,604	1,583	— 21	2	2,887	— 170
„ Motor Buses	„ 13	306	333	+ 27	2	595	+ 10
Rotherham Corporation	„ 10	2,164	2,076	— 88	1	2,076	— 88
Salford Corporation ..	„ 16	10,380	9,811	— 569	2¾	22,520	— 2,307
Sheffield Corporation..	„ 16	18,805	17,799	— 1,006	2¾	40,246	— 3,930
Southampton Corp. ..	„ 12	3,124	2,891	— 233	1½	4,818	— 1,102
„ Motor Buses	„ 12	88	102	+ 14	1½	173	+ 4
Southend-on-Sea Corp.	„ 12	1,864	1,968	+ 104	2	3,381	— 203
South Shields Corp. ..	Mar. 31	1,391	1,267	— 123	52	88,183	— 12,704
St. Helens Corporation	April 11	1,775	1,498	— 277	2	2,391	— 553
Su[illegible] Corp. ..	„ 16	2,443	2,428	— 15	2	5,632	— 863
Swindon Corporation..	„ 12	365	338	— 27	1½	569	— 156
Tyneside Trys., Trds...	„ 5	1,154	817	— 337	14	10,733	— 6,176
Wallasey Corp. ..	„ 15	2,640	2,404	— 236	2¼	5,187	— 1,021
„ Motor Buses	„ 15	223	192	— 31	2¼	445	+ 67
Walsall Corporation ..	„ 15	1,643	1,658	+ 15	2	3,647	— 319
„ Motor Buses	„ 15	870	920	+ 50	2	2,056	— 195
Walthamstow U.D.C....	„ 15	2,020	1,976	— 44	2¼	4,119	— 309
Warrington Corp. ..	„ 13	1,047	1,025	— 22	2	2,000	— 81
West Ham Corp. ..	„ 13	6,083	5,877	— 206	1¾	10,618	— 1,587
Wolverhampton Corp.	„ 19	2,120	2,603	+ 483	3	6,492	+ 192
„ Motor Buses	„ 19	560	851	+ 291	3	1,985	+ 310

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1920-21.	1921-22.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	April 15	£85,004	79,509	15	£1,247,833	+ 46,778
Ballarat & Ben. (4 wks.)	Jan.	4,594	4,805	44	50,657	+ 3,120
Brazilian Traction (Mlrs)	Feb.	11,941,000	14,473,000	8	29,505,000	+ 4,689,000
Brisbane	Mar.	46,300	51,300	13	143,890	+ 8,105
British Columbia $	Feb.	838,682	821,828	34	6,921,985	+ 157,547
Buenos Aires Lacroze ..	Mar.	59,365	61,775	39	521,819	+ 11,105
Burmah Tr. & Lght. Rs.	Mar.	50,931	60,926	12	463,423	+ 55,324
Calcutta .. Rs.	April 15	89,025	105,536	15	1,590,597	+ 606,080
Cape Town	Feb.	..	26,980	..	..	..
Carthagena & Herrerias	Mar.	2,226	2,145	12	7,993	— 949
Cordoba	Jan.	18,696	22,152	43	230,068	+ 32,934
East India	Mar.	4,168	4,446	34	33,017	— 410
Kalgoorlie	Dec.	3,140	2,814	52	27,758	— 9,054
La Plata . ..	Mar.	* 3,403	7,067	13	20,109	+ 9,471
Madras (2 weeks) Rs.	April 15	49,568	56,445	15	347,677	+ 152,465
Manila .. .. $	Feb.	306,389	310,001	8	619,253	— 8,585
Montevideo	Mar.	48,925	51,158	21	231,459	— 9,229
Para	Feb.	20,545	21,582	13	67,208	— 1,821
Pernambuco	April 16	3,989	3,440	15¼	55,855	— 13,312
Port Elizabeth	Feb.	..	6,690	..	..	..
Rangoon .. Rs.	Feb.	120,718	130,583	8	268,433	+ 25,157
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Feb. 25	12,797	13,535	8	122,295	+ 34,805
Winnipeg .. $	Feb.	460,125	498,577	8	1,005,624	+ 39,270

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

Common Fund Companies.		
Metropolitan District Rly. Co. ..	Week ending April 15, 1922 ..	£218,060
London Electric Rly. Co.	Corresponding week last year ..	236,503
City & South London Rly. Co. ..	Decrease	18,443
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	3,175,168
London General Omnibus Co., Ltd.	Corresponding period last year ..	3,447,705
	Decrease	272,537
London & Suburban Traction Group		
Metropolitan Elec. Tramways, Ltd.	Week ending April 15, 1922 ..	£50,634
London United Tramways, Ltd.	Corresponding week last year ..	53,568
South Met. Elec. Tr. & Ltg. Co., Ltd.	Decrease	2,934
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	694,055
Gearless Motor Omnibus Co., Ltd.	Corresponding period last year ..	762,823
	Decrease	68,768

	Passenger.	Goods.	Total.
METROPOLITAN RAILWAY			
Week ending April 15, 1922 ...	£33,478	3,233	36,711
Total Receipts (15 weeks) ...	492,053	56,817	548,870
MERSEY RAILWAY			
Week ending April 15, 1922 ...	—	—	4,191
Total Receipts (15 weeks) ..	—	—	70,577

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THE
Tramway AND Railway World
FOUNDED IN 1892.

OFFICES:—AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.2

Telephone No.: GERRARD 2948.
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THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

LONDON, APRIL 29, 1922.

THE DEEPENING OF RAIL GROOVES.

In the course of his lecture to the Institute of Transport on tramway operation, Mr. J. K. Bruce made an interesting allusion to rail-groove deepening, of which a considerable amount has been done on the London County Council tramways. Mr. Bruce said that two or three additional years of life may be imparted to the rails by milling one-eighth of an inch to one-quarter of an inch from the original rail-groove bottom. If this calculation were intended to apply to tramway systems generally, we believe that the case was a little understated. The lecturer, however, had no doubt the London County Council undertaking in mind, in which contingency his reference to "two or three years" would, of course, be quite true. The length of extra life which may be given to a rail naturally depends upon the rapidity with which the rail is rendered useless by the wear and tear of traffic. On the London County Council system, the average life of the track is under ten years, whereas throughout the country generally it is about 14 years, representing one thirty-second of an inch wear per annum. It will be understood, therefore, that in the latter case, milling of the groove to the extent of one-eighth of an inch would give four years further life to the rail, or, were the operation carried to a depth of one quarter of an inch, seven or perhaps eight years longer use may be got out of the metal. On rails of the British Standard section, the useful life may be extended from six to eight years by taking out three-sixteenths or a quarter of an inch. Leaving figures aside, however, it is well that Mr. Bruce has drawn attention to the matter of rail-milling and grinding, and the accompanying process of welding, as these are playing an increasingly important part in the work of track maintenance. For something like seventeen years the operations of milling and grinding have been in course of perfection, and a considerable fund of experience has been acquired. Most tramway managers will admit the necessity of having recourse to an efficient electrically-driven milling and grinding machine for trueing up worn sections of track, defective points and crossings, for grinding joints which have been built up, and for the milling of grooves. Not only is the life of the track enhanced in this way, but by the removal of corrugations—to some extent at least—the riding of the cars is made easier, and deterioration of rolling-stock is checked. As regards the particular machine to be used, it is important that only those of proved efficiency should be employed, as the work requires to be most carefully executed, otherwise the rails may be subjected to extensive damage.

LIVERPOOL CORPORATION TRAMWAYS.

NEW WORKING CONDITIONS: AGREEMENT WITH EMPLOYEES.

The following is the text of an agreement as to working conditions, etc., which was entered into between Liverpool Corporation Tramways Committee and their employees on March 22, 1922:

Clause 1.—The working week shall consist of six days of eight hours per day, inclusive of signing on and signing off.

Clause 2.—(*a*) Every employee except those required to sign the spare sheet shall be guaranteed a working week of 48 hours, inclusive of signing on and signing off, or payment equivalent thereto, subject to such employee presenting himself for work at the appointed time on each of the six days, provided that this condition shall only apply to men who were in the tramway service on or before December 31, 1921; (*b*) Employees who shall have joined, or who shall join the service after December 31, 1921, shall, for the purpose of the foregoing condition, be treated as spare men; (*c*) Employees who shall be required on any day to sign the spare sheet, shall be entitled, if they do not receive any duty on such day, to an allowance of four hours pay for such day, and employees who shall be required to sign the spare sheet for six days in any week shall be entitled to receive such a sum as, with such allowances as aforesaid, will amount to 32 hours' pay; (*d*) At no time shall there be more than 10 per cent. of the drivers and conductors on the spare sheet. Such 10 per cent. shall not include men who have been placed on the spare sheet for disciplinary reasons; (*e*) When any employee has been on the spare sheet—except those placed thereon for disciplinary reasons—for such time as entitles him to the maximum rate of pay, *viz.*, two years, he shall be treated as a full time employee, and shall be guaranteed 48 hours pay per week.

Clause 3.—The Corporation shall be at liberty to utilise the services of any employee for whom work cannot be found on the cars upon such other work as may be considered desirable by the Corporation, subject to such other work not infringing on another man's job, and only being of a temporary character.

Clause 4.—Spread-over time shall be reduced to the lowest possible minimum, consistent with an efficient service, and in no case shall such spread-over exceed 12 hours per day.

Clause 5.—Overtime shall be calculated as time and a quarter for the first two hours, and time and a half for all hours afterwards. Each day shall stand alone as regards the payment of overtime.

Clause 6.—Ordinary Sunday work shall be paid for at the rate of time and a quarter.

Clause 7.—Any employee being called upon to work on his seventh or rest day shall be paid at the rate of time and a quarter on the rate prevailing on that day.

Clause 8.—The following days shall be recognised as National Bank Holidays: Easter Monday, Whit Monday, August Bank Holiday, and Boxing Day, when time and a half shall be paid for all time worked.

Clause 9.—Christmas Day and Good Friday shall be paid for at the rate of double time, calculated on ordinary day rates. If any employee shall not be required to work on Christmas Day or Good Friday, he shall receive a day's pay, calculated on ordinary day rates, for each of such days on which he does not work.

Clause 10.—Eight days' holiday with pay shall be granted to all employees after 12 months' continuous service. In calculating such holiday, rest days shall not be included.

Clause 11.—No employee shall be entitled to payment in lieu of holiday.

Clause 12.—The adult rate of pay shall only apply to employees aged 21 years and over. Employees under the age of 21 years shall be paid on the scale at present in operation.

Clause 13.—The working week of night shed assistants shall consist of 48 hours, such hours to be inclusive of a meal-time of not less than 30 minutes each night. Shed assistants on day work shall be granted a working week of 47 hours.

Clause 14.—Shed assistants on regular night work shall be paid 1s. per night extra for night work, and shed assistants under the age of 21, 6d. per night extra for night work.

Clause 15.—(*a*) The present sliding scale revision of wages shall be continued in accordance with the changes in the cost of living Board of Trade index figure giving a variation of 1s. per week for every complete five points either way in the published figure for the month preceding that in which the revision is to take place, commencing from the figure of 135; (*b*) The next revision of wages shall take effect as and from the beginning of the first full pay period following May 1, 1922, and such revisions as shall have taken place previous to this agreement shall be taken into account in calculating the next revision; (*c*) After the next revision of wages shall have taken place, subsequent revisions shall take place every three months.

Clause 16.—In the event of a stoppage in the tramway service, whether complete or partial, from causes beyond the control of the Corporation, such as stoppages due to disputes, serious breakdown of machinery, etc., the guaranteed week shall be suspended, and only the actual time worked shall be paid for.

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Clause 17.—This Agreement shall come into force on April 4, 1922, and shall continue in force until revised or determined, but no revision or determination thereof shall be made unless and until three months' notice of such revision or determination shall have been given by the Corporation or the Employees as the case may be, and no such revision or determination shall take place before September 30, 1922.

Clause 18.—This Agreement shall not apply to employees whose wages and conditions of labour are governed by other Trades Unions Agreements and Awards.

MANCHESTER TRAMWAYS MANAGERSHIP.

MAJOR HENRY MATTINSON APPOINTED.

Major Henry Mattinson (late R.E.), chief civil engineer to Manchester Corporation tramways, has been appointed general manager in succession to Mr. J. M. McElroy, whose resignation, owing to ill-health, was reported in our issue of February 25, 1922. There were 39 applicants for the post, and the Tramways Committee interviewed two of these, besides Mr. Mattinson—Mr. E. S. Rayner and Mr. J. S. D. Moffet, the general managers of Hull and Belfast tramways respectively. The appointment carries a salary of £1,400 a year, and Mr. Mattinson will commence his duties on July 1. Mr. Wood, assistant manager, is also about to retire.

The new manager has been associated with the Manchester tramways for 21 years, and has been chiefly responsible for the construction of almost the whole of the 220 miles of single track which the system possesses. When Mr. McElroy visited the Continent and America to study traffic conditions Mr. Mattinson accompanied him, and afterwards collaborated with him in preparing reports. Mr. Mattinson served his articles in Leeds, and before going to Manchester held appointments under the corporations of Hull and Wolverhampton. He is an Associate Member of the Institution of Civil Engineers, a member of the Institute of Municipal and County Engineers, and a member of the Institute of Transport. During the war Mr. Mattinson obtained further professional experience in the Army abroad, and gained the rank of major. He joined the East Lancashire Royal Engineers in 1915, and acted as Adjutant at the Carnarvon R.E. training centre. Later, he served with the Egyptian Expeditionary Force between Gaza and Aleppo, and as Construction Engineer, Light Railways, directed the construction of over a hundred miles of track in this region. Following the defeat of the Turks in 1918, Major Mattinson was placed in charge of the restoration of the 600 miles of captured railway from Haifa to Damascus, Beirut, and Aleppo.

MR. J. K. BRUCE ON TRAMWAY OPERATION.

Mr. J. K. Bruce, traffic manager of the London County Council tramways, lectured before the graduates and students of the Institute of Transport at the rooms of the Royal Society of Arts, Adelphi, London, W.C., on Friday, April 21 (as was briefly noted in our issue of last week), on "The operation of a large tramway undertaking, with reference to capacity and costs under given conditions." Mr. Bruce mentioned at the outset that the lecture was to have been given by Mr. J. M. McElroy, general manager of Manchester Corporation Tramways, who had been regrettably prevented by ill-health from carrying out his intention. Throughout the lecture Mr. Bruce dealt with the subject from a general standpoint, but for purposes of illustration, referred particularly to the L.C.C. tramways. In the past the cost of maintenance of permanent way had been seriously affected by rail joints becoming loose. The ideal track was the one without rail joints, and the most efficient and economical way of approaching this ideal was by the general adoption of welded joints. Turning to the question of power supply, Mr. Bruce alluded to the bonus offered by the L.C.C. during the war to motormen and conductors to encourage them to save fuel by economising electrical energy. Since the commencement of the scheme in July, 1918, approximately £24,000 had been distributed to motormen and conductors, and the best results during one quarter last year showed a saving of about 9 per cent. as compared with the average for 1917-18. In speaking of rolling-stock, Mr. Bruce urged the importance of securing well-situated and efficiently organised depots, and said the modern tendency was towards centralisation of all operations which necessitate the employment of large staffs, expensive machinery and the storage of miscellaneous materials and equipment. He referred to the new type of motor which is being fitted on the latest L.C.C. cars, and remarked that it might be suggested that the use of high-speed motors would unduly increase the load on the generating station. In actual practice, however, such a contention was not upheld, as the saving in the number of cars counter-balanced any increase of energy expended. "The fact that the new higher-powered motor is above its job," Mr. Bruce added, "tends to turn the balance as to total energy consumption in its favour. Cars fitted with this new motor give, in practice, a 10 per cent. increase in average speed. If this increase in speed were obtained throughout the service, using, say, 1,500 cars, it would mean a saving of approximately 170 cars, including spares. Such a reduction in cars required would, at present-day figures, represent a saving of at least £70,000 a year for car repairs alone, quite apart from the saving of capital charges on buildings and cars which would also accrue. In addition, there would be a considerably larger amount saved in traffic operation expenses. It is a fortunate circumstance that the standard L.C.C. car can be readily equipped with this new type of motor."

Emphasising the need for efficient traffic operation, Mr. Bruce said the value of the aggregate of seconds saved at junctions and stopping places may be enormous. If one second were saved at every stop made by the L.C.C. cars the approximate daily saving would represent a total of 220 hours. This saving would enable approximately 2,000 additional miles to be run each day, without increase in personnel or the number of cars; or, alternatively, the same number of miles could be run each day with 17 fewer cars. The latter economy would mean a reduction in operating costs of £34,000 a year.

Efficient service without a courteous and energetic traffic operation staff was not possible, Mr. Bruce pointed out. Alertness was one of the most important qualities to be looked for in traffic employees; when this attribute obtained generally in a staff it meant speedier, safer and cheaper service. Discussing the capacity limit of a tramway track, Mr. Bruce said it might be of interest to mention that over one section of the L.C.C. system 195 cars and 27 trailers pass in one direction in one hour, representing a seating capacity, apart from standing passengers, for 16,500 people. On the subject of speed, Mr. Bruce said the average speed at which the services of a tramway undertaking are operated may, after making allowance for special circumstances in particular cases, be taken as a true index of the efficiency of the management. With cars fitted with the more powerful motors referred to an average of ten miles an hour might reasonably be expected on the L.C.C. system. "The possibilities are great," Mr. Bruce concluded, speaking generally of tramways, "and if full advantage be taken there would appear to be no reason why tramways should not continue to hold the first place in local passenger transport."

TRAMWAY EMPLOYEES' WAGE REDUCTION.

The National Joint Council for the Tramway Industry has notified its members that, in view of the cost of living figure for April having fallen to 82 per cent. over that for August, 1914, reductions will be made in wages on and from the commencement of the first full pay period in May, 1922, as follows:—Employees aged 18 and over, 2s. per week (making a total reduction of 10s. per week); employees under 18 years of age, 1s. per week (making a total reduction of 5s. per week).

An adjustment is also to be made on the same date upon the following sliding scale in respect of youths between 14 and 19 years of age, in accordance with the agreement of February 15, 1922:—At the rate of 3d. per week for every five points, rise or fall, in the cost of living from 100 per cent. as a datum figure. The reduction will therefore be at the rate of 9d. per week from the following scale:—

Age.	Basic.	Bonus.	Total.
14—15	10s. 0d.	5s. 0d.	15s. 0d.
15—16	12s. 0d.	5s. 0d.	17s. 0d.
16—17	14s. 0d.	5s. 0d.	19s 0d.
17—18	18s. 6d.	5s. 0d.	23s. 6d.
18—19	24s. 0d.	5s. 0d.	29s. 0d.

LEEDS CITY TRAMWAYS.

Alderman R. A. Smithson, Chairman of the Leeds City Tramways, submitted to the Tramways Committee on Monday a financial statement of the results of working of the Leeds City Tramways for the year ended March 31, 1922. A summary of the results is appended:

	Year ended March 31, 1922.	Average per car mile. 1922.	Year ended March 31, 1921.	Average per car mile. 1921.
	£	d.	£	d.
Traffic revenue	953,906	24·546	989,690	23·340
Sundry revenue	5,797	·149	5,947	·140
Total revenue	959,703	24·695	995,637	23·480
Working expenses	702,250	18,070	729 345	17·200
Gross profit	257,453	6·625	266,292	6·280
Add Interest on Investments ..	15,978	·411	26,895	·634
Bank Interest	177	·004	2,423	·057
From Unemployed Grants Com. ..	2,451	·063	..	..
	276,059	7·103	295,610	6·971
Against which is charged:				
Loan charges	132,164	3·401	128,337	3·027
Do., Sovereign St. estate	3,818	·098	3,818	·090
Do., Burmantofts property	135	·003	135	·003
Revenue contribution to capital outlay	1,561	·040	2,059	·049
Rental of Morley Light Railway ..	2,701	·069	2,596	·061
Income tax	38,385	·988	52,832	1·246
Permanent way renewals	140,561	3.617	100,211	2·363
	319,325	8·216	289,988	6·839
Surplus or deficit	—43,266	—1·113	+5,622	+·132

The total receipts, miles run, etc., are appended—

	Year ended March 31, 1922.	Year ended March 31, 1921.	Increase.	Per Cent. of Increase.
Total receipts	959,703	995,638	33,935	3·609
Miles run	9,326,755	10,176,874	—850,119	8·353
Passengers carried	129,707,972	138,621,331	—8,913,359	6·430
Receipts per mile	24·695d.	23·480d.	+1·215d.	5·170
Average fare paid per passenger ..	1·741d.	1·696d.	+·045d.	2·653
Population served	557,000	557,000	..	..
Number of times population carried	233	249	—16	6·426
Amount paid per head of population	33/9	35/2	—1/5	4·028

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MISCELLANEOUS NEWS AND NOTES.

Proposed Cornish Light Railway.—Helston (Cornwall) Rural Council are considering a scheme for the construction of a light railway from Helston to Lizard.

Penny Fares at Hastings.—Hastings Tramways Company, Ltd., introduced a number of penny stages on their system on Sunday last and withdrew the 1½d. stages.

Light Railways in Nigeria.—Sir Hector Duff, in his published report on the cotton industry in Nigeria, recommends the further development of light railways there.

Letter Boxes on Hull Cars.—Hull Tramways Committee propose to make an experiment in placing letter boxes on cars on two routes for about two months. A suggestion has been made that the Post Office should make a payment of £30 per annum while the experiment is in operation.

Glasgow and Paisley Tramways Purchase.—Glasgow Corporation Sub-Committee on Tramways Extensions decided on Wednesday by five votes to four to recommend the Tramways Committee and the Corporation to offer £250,000 for the tramway undertaking of the Paisley District Tramways Company. An amendment was that an offer of £200,000 should be made.

Future of the Ministry of Transport.—In the House of Commons on Thursday Mr. Chamberlain stated, in reply to Captain R. Terrell, that the continuance of the office of Minister of Transport was required by statute, but the work was mainly done by the Parliamentary Under-Secretary, and the Minister received no salary. One of the Patronage Secretaries also received no salary. That was as far as the Government could go at present.

The Dearne Valley Light Railway scheme was alluded to at a meeting of Wombwell Council, when the Clerk stated, in reply to a question, that the Council was pledged to support the project. The Chairman explained that the scheme received much opposition in its Parliamentary stages, and since that time the work had been held up by the high cost of materials. As soon as things became normal he presumed that the work of construction would proceed.

Street Accidents.—In reply to a question in the House of Commons on Wednesday, Mr. Shortt gave the number of street accidents in England and Wales during the years 1913 to 1921 as follows:—

	Fatal.	Non-Fatal.		Fatal.	Non-Fatal.
1913 ..	1,743	38,050	1918 ..	1,852	31,604
1914 ..	1,991	53,481	1919 ..	2,239	43,305
1915 ..	2,564	54,222	1920 ..	2,386	49,317
1916 ..	2,393	46,090	1921 ..	2,328	55,153
1917 ..	2,047	38,326			

He added that the Ministry of Transport was not prepared at the present time to recommend the appointment of a Committee to report on methods of regulating traffic with a view to minimising such accidents, but he pointed out that the second interim report of the Departmental Committee on the Regulation of Road Vehicles contained various suggestions for minimising the risk of accidents and for the institution of inquiries into road accidents of a serious character.

Cheap Mid-day Fares at West Ham.—The general manager of West Ham Corporation Tramways (Mr. L. Slattery), having analysed the results of cheap mid-day fares (2d. "all the way"), has stated that the increased number of twopenny passengers has not been so great as the falling off in the threepenny and higher fares. He says, however, that having regard to the present financial position of the undertaking, and the uncertainty of the future, he cannot recommend any alteration in fares. The committee have agreed that no change shall be made.

Royal Commission on London Government.—At the resumed sitting of the Royal Commission on London Government on Tuesday, evidence was given by Sir Herbert Nield, K.C., M.P., chairman of the Parliamentary and County Building Committees of Middlesex County Council. Mr. Robert Donald, a member of the Commission, questioned Sir Herbert with regard to the lease of the Middlesex tramways to the Metropolitan Electric Tramways Company, and suggested that it had resulted in a loss to the county. Witness did not agree.

Sunderland Tramway Strike Ended.—A settlement was effected on April 21 of the strike of employees of the Sunderland District Electric Tramways, Ltd., which had been in progress for 11 weeks. As the result of the intervention of Alderman Robert Richardson, M.P. for the Division, a conference took place between representatives of the company and of the employees. It will be remembered that the cause of the strike was the decision by the company to effect a wage reduction in excess of that provided for by the National Agreement. In view of the serious decrease in their revenue, they contended that they were unable to continue to pay the then existing wage-bill and sought a reduction which, in the case of the higher paid men, amounted to 10s. a week. At the conference last week an agreement was reached that the men accept a reduction of 5s. per week, but that no further decrease shall take place when the national wages scale is revised at the beginning of May.

Edinburgh Tramway Extensions.—Edinburgh Corporation are to apply to the Secretary for Scotland for a Provisional Order under the Private Legislation Procedure (Scotland) Act, 1899, for power to construct and maintain tramways, to acquire lands for improvements, and for other purposes. Among the estimates prepared for the proposed new undertakings are the following:—In connection with the tramways, £105,144; for conversion to electric traction of the remaining sections of the Corporation tramways, £110,644; for tramway equipment, cars, other rolling stock, and depots, £314,367. Seven new tramway routes are projected and are expected to be completed within seven years. Power is also sought in the Order for the transfer to the Corporation of the tramway and electrical undertakings of the Musselburgh and District Electric Light and Traction Company, Ltd. The Tramway Committee are consulting the Director of the College of Art and his colleagues on the question of the decorative design to be used on the one-piece tapering poles which will be erected in Princes Street, and as to the most suitable type of lamp to be suspended from the poles.

New Through Services in London.—The tramway systems of the London County Council and the London United Tramways have now been linked up at Hammersmith by the laying of a short length of track in the Broadway. The new service under the through-running agreement between the two undertakings will commence on Monday next, and the route from the Borough of Southwark to Kew will afford one of the longest through journeys by tramway in London. Starting from the Hop Exchange, near London Bridge, cars will run by way of Wandsworth, Putney, across Putney Bridge, through Fulham Palace Road, and from Hammersmith over the London United Company's line to Kew, with a corresponding return service. The following alterations to the London United Tramways service will take effect on all days of the week:—The Hounslow and Hammersmith service will be diverted to Shepherd's Bush; the Shepherd's Bush and Kew service will be projected to Brentford (G.W.R. Station) on week days (Mondays to Fridays); the Hampton Court service will run as at present to Hammersmith. The following further alterations will also come into operation next week:—The Tooting and Hampton Court service will not run beyond Wimbledon Station; the L.C.C. tramways will introduce a new service from the Embankment *via* Merton, to Wimbledon Station (about ten miles), connecting at that point with the London United Tramways service to Hampton Court. On Mondays to Fridays, the mid-day fare will be 2d. all the way between the Embankment and Wimbledon-hill. On the Kew Bridge through service, mid-day passengers can travel at 2d. between Central London and Hammersmith Broadway, and thence, paying ordinary fare, 3d. to Kew Bridge.

PERSONAL.

Mr. J. A. Aspinall will lecture at the Institution of Civil Engineers on May 2, at 6 p.m., on "Some Post-war Problems of Transport."

Mr. Roger T. Smith on Monday, May 8, at 5.30 p.m., will read a paper on "Recent Improvements in Equipment for Electric Traction on Railways Making for Economy," before the Institute of Transport at the Institution of Civil Engineers.

Alderman Sir William E. Clegg, J.P., chairman of Sheffield Corporation Tramways and Motors Committee, received the Freedom of the City on April 21—his seventieth birthday—in recognition of long and distinguished services to Sheffield. As was noted in our issue of March 11 last, it is principally in connection with the development of the tramways that Sir William's work for the city is known. He was appointed chairman of the committee when that body was formed in 1896 and during his term of office the motor omnibus system was successfully inaugurated.

Mr. Joseph A. Bromley, general manager and engineer of Keighley Corporation tramways, has been appointed general manager of the York Corporation tramways at a salary of £600 per annum in succession to Mr. J. W. Hame, resigned. Mr. Bromley gained much of his experience on the Leeds undertaking, where he held the post of chief assistant rolling-stock superintendent before going to Keighley at the beginning of last year. Here he set himself to improve the services of both tramcars and railless trolley vehicles, introducing the queue system, and subsequently arranging motor omnibus services on the Oakworth and Sutton routes. His knowledge of railless traction will, of course, find scope at York, where a system of this type was introduced over 12 months ago.

FINANCIAL.

Rochdale Tramways Deficit.—There was a loss of £19,500 on Rochdale Corporation tramways last year.

City of Buenos Ayres Tramways Co. (1904).—A dividend of 1s. 3d. per share (being at the rate of 5 per cent. per annum), less tax, for three months ending March 31 last, has been declared.

Rangoon Electric Tramway and Supply Company.—A dividend has been declared of Rs. 1 per share on the ordinary shares, free of tax, to shareholders domiciled in India or Burma, making Rs. 1½ for the year. A sum of £30,000 is placed to reserve for renewals, and £12,969 is carried forward.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended April 15 give total receipts of £356,078, or £23,673 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £182 15s. 9d. per mile of single track, and last year at the rate of £194 18s. 10d., thus showing a decrease for the week of £12 3s. 1d. per mile open.

Cardiff Tramway Receipts.—The general manager of Cardiff Corporation Tramways (Mr. R. L. Horsfield) has reported that for the past year the passenger receipts on the tramcars were £277,835, a decrease on the previous year of £13,054. The number of passengers decreased by 2,525,232 to 40,114,675. There was also a decrease in the wages bill of £5,651, which brought it to £157,678 for the year. The fall in income he could only account for by the depression in trade and the interference with the ordinary traffic by reason of the reconstruction of the track.

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Hull Tramway Receipts.—Figures presented to Hull Tramways Committee on Monday showed that the tramway receipts for the four weeks ended April 15 revealed a decrease of £2,150, as compared with the corresponding period of last year, while the total decrease for the present financial year was £21,345.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended April 26 amounted to £91,640, a decrease of £8,433 compared with the corresponding period of last year. The route length was 155·91 miles, as compared with 152·26 a year ago. From April 1 (the commencement of the financial year) to April 26 (3¾ weeks), the total receipts were £341,402, a decrease of £30,747 on the corresponding period of 1921.

Bradford Corporation Tramways.—The receipts of Bradford Corporation tramways for the year ended March 31, 1922, were £709,900, as compared with £702,108 for the previous year, an increase of £7,792. The following figures were recently presented to the committee, those in parenthesis being for the year 1920-21: Average receipts per car mile, 27.78d. (26.54d.); mileage run—tramways and railless 6,132,403 (6,347,404); passengers carried—tramways and railless, 79,620,044 (88,865,557); journeys per annum per head of population (based on 370,000 population), 215 (240); number of days worked 356 (364)—the decrease of eight days being due to the coal strike last year; the number of parcels carried, 771,448 (740,699).

CONTRACTS.

Edinburgh Town Council have accepted the tender of the Metropolitan-Vickers Electrical Company, Ltd., for motors and of the English Electric Company, Ltd., for controllers.

Bradford Tramways Committee have accepted the tender of Millars' Timber and Trading Co. for the supply of a "tructractor" at £505, and three trailer-tipping wagons at £12 10s. each.

Keighley and Leyland Omnibuses.—Keighley Tramways Committee have recommended that two of the omnibuses at present on hire from Leyland Motors, Ltd., be purchased at £1,575 each.

BUSINESS NOTES.

The Jack Engineering Company, of Ferdinand Place, Chalk Farm, N.W.1, inform us that they hold a full range of spare parts of all standard jacks. Parts required for replacement can be despatched immediately on receipt of application, quoting type and number.

"B.R.C. Roads."—Under this title, the British Reinforced Concrete Engineering Company, of Dickinson Street, Manchester, have issued an illustrated record of examples of their work, which sets an unusually high standard as a commercial publication. It contains 160 pages of excellent photographs taken in all parts of the British Isles and abroad, showing roads of every kind either under construction with B.R.C. fabric or in their completed state. There is little comment, for little is needed, as the captions under the illustrations show that most cities and towns of consequence realise the need for an efficient and durable method of road construction. In the preface, however, it is pointed out that B.R.C. tramway foundations, like the ordinary roadway foundations, afford a permanently level bed on which to build a lasting superstructure. The effect of the reinforcement is to spread the load over the whole width of foundation. Apart from its publicity uses, the book, which is charmingly finished in leather, may be regarded as a welcome contribution to the literature of road construction and maintenance.

METAL PRICES.

Supplied by the British Insulated and Helsby Cables, Ltd.			Price on April 27, 1922.	Price on April 20, 1922.
COPPER.	Best Selected	per ton	£63	£63
	Electro Wirebars	per ton	£66 10s.	£66
	H.C. Wire, basis	per lb.	10 1/16d.	10d.
	Sheet	per lb.	9 7/16d.	9 7/16d.
PHOSPHOR BRONZE WIRE (Telephone)		per lb.	1s. 2 1/16d.	1s. 2d.
BRASS 60/40	Rod, basis	per lb.	7¼d.	7¼d.
	Sheet "	per lb.	9½d.	9½d.
	Wire "	per lb.	10d.	10d.
PIG IRON.	Cleveland Warrants	per ton	£4 15s.	£4 15s.
	Galvanised Stee. Wire, 8 S.W.G.	per ton	£18	£18
LEAD PIG.	English	per ton	£25 5s.	£24
	Foreign or Colonial	per ton	£24 2s. 6d.	£22 17s. 6d.
TIN.	Ingot	per ton	£152 15s.	£152
	Wire, basis	per lb.	2s. 1¼d.	2s. 1d.

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	April 19	3,461	3,298	— 163	46¾	162.375	— 14.053
" Motor Buses	" 19	62	135	+ 73	46¾	10,278	+ 8,669
Ayr Corporation ..	" 22	584	681	+ 97	49	33,566	— 2,725
Barrow Corporation ..	" 15	863	594	— 269	2	1,173	— 564
Belfast City	" 21	12,495	12,409	— 86	3	36.537	— 1,543
Birkenhead Corporation	" 23	2,556	2,677	+ 121	3¾	8.270	— 491
" Motor Buses	" 23	529	811	+ 282	3¾	2.231	+ 451
Birmingham Corporat'n	" 15	30,688	27,464	— 3,224	2	61,455	— 10,277
" Motor Buses	" 15	1,964	1,624	— 340	2	3,637	— 1,103
Blackburn Corporation	" 19	2,428	3,134	+ 706	3¾	8,529	— 1,237
Bradford Corporation..	" 22	13,518	15,232	+ 1,714	4	45,039	— 2,180
Burnley Corporation ..	" 22	1,481	3,366	+ 1,885	..	..	..
Burton-on-Trent Corp.	" 23	586	535	— 51	3	1,709	— 242
Bury Corporation ..	" 23	2,712	2,529	— 183	3¾	8,177	— 891
Chatham & District ..	" 13	1,713	1,602	— 111	15	21,683	— 2,904
Chesterfield Corporat'n.	" 17	1,296	1,400	+ 104	2	3,265	— 259
Derby Corporation ..	" 22	2,214	2,230	+ 16	3	6,856	— 790
Dundee City ..	" 19	3,179	3,006	— 173	48¾	152,340	+ 2,914
East Ham Corporation	" 22	2,005	2,209	+ 204	3½	6,950	+ 282
Edinburgh Corp. Trys.	" 15	..	11,919	..	48	596,178	— 41,317
" Motor Buses	" 15	..	3,454	..	48	168,234	..
Glasgow Corporation ..	" 22	46,982	43,596	— 3,386	46½	2,096,392	— 13,173
Glossop (U.E. Sup. Co.)	" 22	239	246	+ 7	16	3,668	— 120
Halifax Corporation ..	" 18	3,950	5,166	+ 1,216	2½	11,430	— 164
" Motor Buses	" 18	104	66	— 38	2½	157	— 138
" Railless Cars	" 18	..	84	..	2½	158	...
Huddersfield Corporatn.	" 22	5,006	6,510	+ 1,504	4	21,366	— 419
Ilford U.D. Council ..	" 22	1,408	1,491	+ 83	3½	4,786	+ 235
Ipswich Corporation ...	" 22	773	843	+ 70	3	2,595	— 31
Isle of Thanet ..	" 19	596	1.303	+ 707	28½	17,906	+ 640
Kilmarnock Corporat'n	" 22	345	329	— 16	48¾	17,184	— 865
Leicester Corporation..	" 22	6.103	7,464	+ 1,361	16	114.851	+ 10,678
Liverpool Corporation	" 22	23.049	29,551	+ 6,502	16	460,049	+ 10,046
London County Ccl. ..	" 26	100,073	91,640	— 8,433	3¾	341,402	— 30,747
Maidstone Corporation	" 20	435	509	+ 74	2½	1.723	— 64
Manchester Corp. ..	" 22	37,523	37,804	+ 281	3	117,165	— 1,808
Newcastle-on-T. Corp.	" 15	10,978	9,567	— 1,411	2	21,309	— 2,594
Nottingham Corp.	" 20	7,085	7,946	+ 861	3	22,304	+ 230
Oldham Corporation ...	" 24	4,212	4,908	+ 696	4	19,915	— 784
Preston Corporation ...	" 19	1,857	1,967	+ 110	2½	4,954	— 565
" Motor Buses	" 19	..	145	..	2½	365	..
Reading Corporation ...	" 13	1,604	1,583	— 21	2	2,887	— 170
" Motor Buses	" 13	306	333	+ 27	2	595	+ 10
Rotherham Corporation	" 24	2,093	2,182	+ 89	3	6,607	+ 258
Salford Corporation ..	" 23	10,864	11.200	+ 336	3¾	33,719	— 1,520
Sheffield Corporation..	" 23	19,656	18,836	— 820	3¾	59,082	— 4,750
Southampton Corp. ..	" 19	2,990	3,213	+ 223	2	8,032	— 878
" Motor Buses	" 19	87	100	+ 13	2	273	+ 17
Southend-on-Sea Corp.	" 19	1,724	3,066	+ 1,342	3	6,447	— 1,139
South Shields Corp. ..	" 22	1,362	1,715	+ 353	3	5,461	+ 543
St. Helens Corporation	" 18	1,628	1,827	+ 199	3	4,218	— 354
Sunderland Corp. ..	" 23	2,013	2,546	+ 533	3	8,179	— 329
Swindon Corporation..	" 19	346	398	+ 52	2½	967	— 105
Tyneside Trys., Trds...	" 12	1,100	799	— 301	15	11,533	— 6,477
Wallasey Corp. ..	" 22	2,570	2,897	+ 327	3½	8,084	— 694
" Motor Buses	" 22	164	284	+ 120	3½	743	+ 110
Walsall Corporation ..	" 22	1,583	1,855	+ 272	3	5,502	— 47
" Motor Buses	" 22	823	1,170	+ 347	3	3,226	+ 153
Walthamstow U.D.C....	" 32	1,747	1,896	+ 149	3½	6,016	— 141
Warrington Corp. ..	" 20	1,008	993	— 15	3	2,993	— 96
West Ham Corp. ..	" 20	5,757	6,267	+ 510	2¾	16,886	— 1,077
Wolverhampton Corp.	" 26	2,217	2,189	— 28	4	8,682	+ 163
" Motor Buses	" 26	588	626	+ 38	4	2,612	+ 349

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1921.	1922.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..	April 22	£85.103	86,710	16	£1,334,543	+ 48,385
Ballarat & Ben. (4 wks.)	Feb. 26	4.701	4.797	48	55.454	+ 3,216
Brazilian Traction (Mlrs)	Feb.	11,941.000	14,473.000	8	29,505.000	+ 4,689.000
Brisbane	Mar.	46.300	51,300	13	143,890	+ 8.105
British Columbia $	Feb.	838.682	821,828	34	6,921,985	+ 157,547
Buenos Aires Lacroze ..	Mar.	59.365	61,775	39	521,819	+ 11.105
Burmah Tr. & Lght. Rs.	Mar.	50,931	60.926	34	463,423	+ 55,324
Calcutta .. Rs.	April 22	88,477	107,108	16	1,697,705	+ 624,711
Cape Town	Mar.	..	29,930	..	.	..
Carthagena & Herrerias	Mar.	2.226	2,145	13	7,993	— 949
Cordoba	Jan.	18,696	22,152	43	230.068	+ 32,934
East India	Mar.	4,168	4.446	34	33.017	— 410
Kalgoorlie ..	Jan.	2,418	2,180	4	2,180	+ 32
La Plata ..	Mar.	* 3,403	7,067	13	20,109	+ 9,471
Madras (2 weeks) Rs.	April 15	49.568	56,445	15	347,677	+ 152,465
Manila .. .. $	Mar.	298.317	284.576	13	903,829	— 22,255
Montevideo	Mar.	48,925	51,158	21	231,459	— 9,229
Para	Mar.	22,189	22,238	17	89,446	— 1,772
Pernambuco	April 23	3,974	3.044	16½	58,898	— 14,242
Port Elizabeth	Mar.	..	7,851	..	..	..
Rangoon .. Rs.	Mar.	158,121	150,500	13	418,933	+ 17,536
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Mar. 11	14,274	14,451	10	151,287	+ 36,159
Winnipeg .. $	Feb.	460,125	498.577	8	1,005,624	+ 39,270

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

COMMON FUND COMPANIES.		
Metropolitan District Rly. Co. ..	Week ending April 22, 1922 ..	£225.339
London Electric Rly. Co.	Corresponding week last year ..	220.423
City & South London Rly. Co. ..	Increase	4.916
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	3,400,507
London General Omnibus Co., Ltd.	Corresponding period last year ..	3,668.128
	Decrease	267,621

LONDON & SUBURBAN TRACTION GROUP		
Metropolitan Elec. Tramways, Ltd.	Week ending April 22, 1922 ..	£52,264
London United Tramways, Ltd.	Corresponding week last year ..	48.596
South Met. Elec. Tr. & Ltg. Co., Ltd.	Increase	3.668
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	746,319
Gearless Motor Omnibus Co., Ltd.	Corresponding period last year ..	811,419
	Decrease	65.100

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending April 22, 1922 ...	£33,904	£3.172	£37,076
Total Receipts (16 weeks) ...	525,957	59.989	585.946
MERSEY RAILWAY			
Week ending April 22, 1922 ...	—	—	£4,422
Total Receipts (16 weeks) ..	—	—	74.999

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Tramway AND Railway World
FOUNDED IN 1892.

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LONDON, MAY 6, 1922.

INCREASING WEAR ON TRAMWAY TRACKS.

Those responsible for protecting the interests of tramways will take especial note of the question and answer in the House of Lords on Wednesday regarding the wear of roads occasioned by heavy traffic. Lord Harris called attention to the opinion of the House as expressed on April 5, namely, "that the burden thrown on ratepayers through the wear and tear of roads caused by heavy mechanical transport is unreasonable and should be remedied." He asked the Government whether, instead of again referring the subject to a departmental committee, they would submit it to a Parliamentary Committee, and contended that the present position was becoming intolerable. The Minister of Transport denied that the matter had been shelved, and said he was sceptical as to the necessity for further inquiry. Lord Harris, however, was not satisfied, and urged that the present schedule of taxation of motor vehicles was unfair, and that the heavy car ought to bear a tax proportionate to its weight. The Transport Minister then conditionally agreed to consider whether any further inquiry into this aspect of the matter was necessary. The serious disadvantage under which tramways labour at the present time in regard to maintenance of permanent way needs no emphasis here. Committee-men, directors, managers and engineers are only too painfully aware of the increasing gravity of their responsibility for the upkeep of track. County and municipal surveyors are also anxiously beset with difficulty in respect of their roads. The Durham County Surveyor lately pointed out in a report that traffic conditions have entirely changed, and that no reasonable comparison can be made of pre-war and present road maintenance costs. The average unit of weight, speed and the total weight, he says, have enormously increased, and even within the last two years the destructive effect of traffic is out of all proportion to any similar period. This statement precisely describes the change which has taken place during the last few years; but the change is by no means complete. Wear and tear occasioned by motor traffic grows daily, and engineers who a year or two ago thought they saw their way to cope with the increasing destruction of their permanent way will find that in the near future the expenditure which they were obliged to incur in the past will be quite inadequate for the proper maintenance of tracks. The whole matter has been so frequently discussed at tramwaymen's gatherings that it is surprising more urgent steps have not been taken to secure a review of their obligations in the light of modern traffic conditions. What the Minister of Transport said indicates that he has, to some extent, an open mind on the subject, and this seems to offer an opportunity which should certainly not be missed. The main difference between tramway and omnibus traffic to-day is the outstanding fact that the motor omnibus has a permanent way provided for it practically free of charge; for, after all, the taxation paid by the omnibus companies is wholly insufficient to compensate for the damage which their vehicles inflict on the road surface, including tramway track.

"POST-WAR TRANSPORT PROBLEMS."

SIR JOHN ASPINALL AND RAILWAY ELECTRIFICATION

Sir John A. F. Aspinall, past-president of the Institution of Civil Engineers, delivered the "James Forrest" lecture at the Institute, Westminster, on Tuesday, taking as his subject "Some Post-war Problems of Transport." The chair was occupied by the President, Mr. W. B. Worthington.

Referring to London traffic, Sir John said that notwithstanding the great capacity for handling traffic possessed by the most modern omnibuses, mainly over very short distances, the extension of railway facilities for London was an urgent necessity. The capacity of a train carrying 400 to 500 people, with such trains succeeding one another at intervals of about 1½ minutes, was required to deal with the rush of travellers morning and evening, most of whom were showing more and more desire to get well out of London. He should not despair of some first-rate scheme being adopted for future gradual development, if it were in the first instance considered by a strong committee of those engaged in handling London traffic, and then legalised with a view to its being financed and carried out in sections. The scheme should be so created as to dovetail in with existing routes in the most economical way for operation, and with a keen eye to public requirements.

Dealing with the advantages of railway electrification, Sir John Aspinall described as most important the fact that the train capacity of any railway, and particularly of any terminal station, was vastly increased by electric working, and thus the capital cost of extensions and widenings could be postponed for many years. One of the advantages of hauling express trains of considerable speed with electric locomotives was that extreme variations of speed were avoided and a better average speed obtained. The very fact of getting away from terminals rapidly would assist in clearing the line at a point where generally the congestion was greatest. In many cases electrification would cost much less than widening. Remarking that there was still hesitation and doubt as to the extension of electric working to main line traffic, Sir John added: "I have no hesitation in saying, in the light of the most modern experience, that there are numerous cases in this country—if the district is carefully selected—where expenditure under this head would be found most remunerative, especially for goods trains. It is a matter for regret that we move so slowly."

London Transport Congress.—Particulars of the Transport Congress which is being organised by the Institute of Transport were given in our issue of April 22. As was then mentioned, the meetings will take place from May 17 to 20. Further particulars received since the publication of the first notice are appended. The papers to be read at the Institution of Civil Engineers on the mornings of the 17th to 19th are expected to be of particular interest. Among other speakers, Sir J. E. Thornycroft will give his views on the future design of self-propelled vehicles, and Mr. Dixon H. Davies will submit some novel proposals on the finance of a modern highway. Space will not permit of a full enumeration of the visits that have been arranged for the afternoons of the 17th to the 20th. These appointments will include visits to the Docks, Neasden power station, the new Great Western arterial road, the Chiswick works of the L.G.O.C., and the new offices at Waterloo of the London and South Western Railway. On Friday the London, Brighton and South Coast Railway will run a special train from Victoria to the London terminal aerodrome at Croydon, the London County Council will run special cars from the Embankment to Greenwich generating station, and the Great Western Railway will provide travelling facilities to their signal works at Reading. Those desirous of participating in the Congress should communicate with the honorary secretary of the Institute, Mr. H. E. Blain, 15, Savoy Street, London, W.C.2.

Proposed Track-Relaying at Burnley.—Burnley Tramways Committee recommend that application be made to the Ministry of Transport for sanction to borrow £46,950 (less £9,450 sinking fund contributions outstanding in respect of work to be superseded) for tramway reconstruction.

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MISCELLANEOUS NEWS AND NOTES.

Proposed Sunday Service for Newport.—Newport (Mon.) Corporation Tramways Committee have recommended the Town Council to permit a Sunday car service.

New Motor Omnibus Service at Rotherham.—A new motor omnibus service is proposed at Rotherham to the Worcester Road housing site. The Tramway Committee have agreed to the arrangement.

No Fare Reduction at Northampton.—Northampton Tramways Committee consider that in view of the diminution of passengers carried they do not feel justified in making any reduction of fares.

Motor Coach Stands.—The Leeds Watch Committee propose that motor coaches be allowed to remain for three hours on the stand in Calverley Street and for two hours in Infirmary Street and City Square.

Rotherham-Doncaster Omnibus Service.—Rotherham Town Council have instructed the Town Clerk to apply to the Ministry of Transport to obtain sanction for the running of omnibuses between Rotherham and Doncaster.

North Devon Light Railway.—It is expected that a start will shortly be made with the construction of the Torrington-Halwill Light Railway, the Minister of Transport having approved the draft contract and specifications.

Centre Poles Discarded at Glasgow.—Glasgow Corporation has decided to remove the centre poles from the Great Western Road and to substitute side poles. It is considered that centre poles constitute an impediment to traffic and a danger to pedestrians.

Hold-up on Manchester Tramways.—A stoppage on part of the southern section of Manchester Corporation tramways during the early morning "rush" period on Monday caused the cars to be held up for about an hour. It was officially stated that an overload was the origin of the trouble.

New Type of Indicator at Liverpool.—A new type of stopping-place indicator has been introduced on Liverpool Corporation Tramways in the form of a triangle usually affixed to an electric standard at a convenient height. In the case of compulsory stops it is coloured red, while a blue triangle indicates a "request" stop.

A Motor Station.—Wakefield Corporation are arranging for a station for motor vehicles in the market ground, and propose to make the following charges :—Motor cars, 1s. a day ; motor coaches, 2s. ; short periods, 1s. ; for the week, 10s. ; and for vehicles plying between the outside districts and the city, 2s. per day.

German Enterprise in Java.—A German house recently sent a special representative to Java to study plans for the electrification of railways. The firm expects to make competitive bids for equipment and supplies if the project is carried out. Estimates of the probable cost have already appeared in the Netherlands Indian Budget.

Reduced Fares at Barrow-in-Furness.—A revised scale of fares and stages has been approved by Barrow-in-Furness Town Council. Penny fares are introduced and higher fares are proportionately decreased. The manager (Mr. J. R. Groves), estimates that the approximate reduction in revenue for the year will be £1,581, and the approximate increase in expenses £1,334, a total of £2,915.

Track Reconstruction at West Bromwich.—West Bromwich General Purposes Committee have approved a proposal that the Corporation tramways from Carter's Green to the Birmingham boundary be reconstructed at an estimated cost of £81,000, and portions of the track from Carter's Green to Wednesbury and Tipton be renewed and repaired at an estimated cost of about £17,000.

Transport Ministry and "Reversed" Stairs.—Councillor Eastwood (vice-chairman of Burnley Tramways Committee) has reported that he and the general manager (Mr. H. Mozley) interviewed representatives of the Ministry of Transport and urged the withdrawal of the Ministry's prohibition of "reversed" staircases on new tramcars. The Ministry intimated their intention of adhering to their prohibition.

Edinburgh Tramways Electrification.—After hearing representations from the ratepayers affected, Edinburgh Tramways Committee decided to proceed as soon as possible with the electrification of the Stockbridge route. The Town Council approved the clauses in a Draft Provisional Order which is being promoted for tramway and other purposes. Among the proposed tramway extensions are lines along George Street (running parallel with Princes Street) and Easter Road.

Small Profit at Bournemouth.—There was a profit on Bournemouth Corporation tramways last year of £159, as compared with a deficit for the previous year of over £17,000, according to the annual report of the general manager (Mr. I. Bulfin). The number of passengers, however, decreased by over 3,000,000. The small profit, despite increased fares, was due to reconstruction on main lines, fewer car miles run, the coal strike, trade depression, etc. The total traffic receipts showed an increase of £10,524, and working expenses were about £5,866 less.

Bristol Tramway Company's Bill.—The Bill promoted by the Bristol Tramways and Carriage Company came before a Select Committee of the House of Commons on Tuesday. Its purpose is to extend the time limited by an Order of the Minister of Transport for the compulsory purchase of lands which the company were already authorised to acquire ; also to extend the time limited by the Order of 1921 for the construction and completion of certain tramways. Mr. W. G. Verdon Smith (managing director) gave evidence. The preamble was found to be proved, and the Bill passed the Committee.

Improved Traction Business in the U.S.A.—The "Electric Railway Journal" of New York says that reports from the U.S. Department of Commerce on foreign conditions show an increased demand for American products, and that there is in other lines an indication of continued though slow resumption of business in the United States. Reports of permanent way reconstruction and purchases of power and railway stock equipment indicate a steady increase.

Oldham's Fortunate Position.—The general manager and engineer of Oldham Corporation tramways (Mr. W. Chamberlain), reporting to the Committee on the past year s working, stated that after paying all charges and without any deduction from the reserve, except in the case of the final payment for new cars, the net balance, being profit, was £18,000, subject to audit and to certain adjustments. As a sum of £1,000 was to be placed to the accidents insurance fund, there would be a net profit of approximately £17,000.

"Current Opinion," the official organ of the Industrial League and Council (82, Victoria Street, London, S.W.1), appears now to be firmly established. The reception of the first number, says the editor, has been most gratifying. The issue of May contains some notes on the Whitley Councils, an article by Mr. John Murray, M.P., who replies to Mr. J. R. Clynes, M.P., on "An Industrial Parliament," and a series of May Day Messages from Lord Leverhulme, the Bishop of Birmingham, Lord Blyth, and other well-known publicists.

Glasgow and Paisley Tramways Purchase.—Glasgow Tramways Committee on Wednesday decided to recommend a continuance of consideration of the proposal to purchase the undertaking of the Paisley District Tramways Company until a special meeting of the Committee on May 19. In the meantime, the general manager (Mr. J. Dalrymple) was instructed to arrange that all members of Glasgow Tramways Committee should be given facilities to inspect the Paisley undertaking.

New President of the B.E.A.M.A.—The Council of the British Electrical & Allied Manufacturers' Association have the pleasure to announce that the Earl of Derby, K.G., has accepted the presidency of the Association. The Council believe that the announcement will afford considerable gratification to the members of the Association and the industry generally. Lord Ampthill, G.C.S.I., who now retires from the presidency, has been good enough to express a wish to maintain his connection with the industry and has accepted the office of first Past President of the Association.

Cheaper Fares in Manchester.—Manchester City Council on Wednesday approved the recommendations of the Tramways Committee for a reduction of fares by increasing the length of the existing penny stages (as mentioned in our issue of April 22 last). On the suggestion of the general manager (Mr. J. M. McElroy), the penny stages will be lengthened from a mile and a quarter to a mile and a half. The fares in Manchester will thus revert to the level at which they stood before the last increase was made. For instance, on the journey from the city to Heaton Park, Middleton, or Withington, there will be a reduction of a halfpenny on the present fare. The revision is experimental only.

The Nottinghamshire and Derbyshire Tramways Bill came before the Unopposed Bills Committee of the House of Commons on Wednesday. The Bill seeks powers for the construction of additional tramways intended to link up the main system of the company with the Ilkeston tramways. It was also proposed to reconstruct part of the tramways so that the whole system would be run on standard gauge. The cost of new construction would be £72,000, for new cars and equipment £38,000, for the completion and purchase of tramways £19,000, and for the purchase of the Ilkeston Tramways £80,000. After formal evidence, the Bill was passed for third reading.

"T.B.R." Guide.—The issue of this popular guide for May, 1922 (Messrs. Rieu, Wiley & Co., 123, Pall Mall, S.W.1) contains particulars of a number of additional services. The compilation is extremely useful, and we are surprised that tramway managers do not more generally arrange for the inclusion in it of their services in greater detail. The number for May contains also a list of motor coach services arranged alphabetically under the starting point. Each service is given a separate paragraph, starting with the name of the firm supplying the service and the chief address for booking. The leaving point of the coaches is given, together with the time of starting and the fares, where obtainable.

Nottingham Corporation Tramways.—The Nottingham Tramways sustained a loss of £372 on the working of the tramway and omnibus services during the past year, due to the depressed state of trade, curtailment of the services during the coal strike, and other unfavourable circumstances. Owing to the increasing volume of traffic, the Tramways Committee have decided that as soon as arrangements can be made two additional cars shall be run from the Market Place to the Arnold terminus at the three busiest periods of the day ; also that an extra early morning car be run on the Mapperley route.

Winnipeg Electric Railway.—In an article on the Winnipeg Electric Railway Company, in a special issue, the *Electrical News* of Toronto describes it as a pioneer industry which has been one of the principal factors in the meteoric development of the city of Winnipeg. The company's predecessors, the Winnipeg Street Railway Company, placed the first horse car in service in 1882, and the first electric street car was run in July, 1901. Two years later the Winnipeg Electric Street Railway Company obtained its charter and entered into an agreement with the City of Winnipeg. Since that time the system has been largely extended, and to-day the company's total investments exceed $25,000,000. It operates

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112 miles of track within the city limits, and 60 miles of track in the suburbs. Its rolling stock consists approximately of 350 cars of a modern type, and the company employs 2,000 men. The company has a hydro-electric plant at Pinawa, on the Winnipeg River, with a capacity of 35,000 h.p., which was completed in 1906. At the time it was built, there was considerable criticism on the plans as too ambitious for the needs of the district, but in ten years the demands for power became so great that the company secured further sites on the Winnipeg River, and its future supply is assured by the Great Falls plant now under construction by the Manitoba Power Company, Ltd. Mr. John Whitsell is the company's manager.

"How London Travels" is the title of the latest message of the London Underground. It states that the Underground tops the list as London's largest traffic undertaking with 1,461,000,000 passengers for 1921. Of this total the motor omnibuses alone carried 931,750,000 passengers. The next largest undertaking is the London County Council tramway system which carried 690,000,000 passengers. The message adds the somewhat ambiguous statement that "the motor omnibus stands first in public favour." The fact that the motor omnibus carries so many passengers is largely explained by the circumstance that the centre of London is served almost entirely by motor omnibuses, tramcars, except at a few points, having no access to this area.

Motor Vehicle Taxation.—In the House of Commons on April 28, Mrs. Wintringham presented a petition on behalf of 3,146 owners of Ford motor cars, praying the House to "reduce the excessive taxation on the same." On Monday Mr. Gee asked the Chancellor of the Exchequer whether he was aware that the tax on a Ford car was identical with that on a car which cost £1,500, and whether in view of the low selling price of the former he would consider the advisability of reducing the tax. Mr. Neal, who replied, said the tax on a motor car did not depend on its value, but on its engine power as calculated under the Treasury (R.A.C.) rating. The whole basis of taxation of motor vehicles, as he had recently said, was to be considered afresh by the Departmental Committee, and it was obvious that the point in question could not with advantage be dealt with separately.

Municipal Tramways Association Journal for May contains an interesting article on Permanent Way Renewals out of Loans, in the course of which the writer says the financial position of tramways has been aggravated by the enormous increase in post-war costs. The net consequence has been to injure beyond repair the splendid financial idealism of pre-war times, so that this generation will be, to all appearance at least, compelled to abandon the high aspiration of acquiring debt free assets of the machinery and plant kind. Rather will they have to repeat the process of borrowing at the end of the assets' life for replacements. The war has impoverished the tramway industry in common with other industries to an unprecedented extent, and the end is not yet in sight, judging by the Budgets for 1922-23, which have so far been published. The Journal contains also reports of committees of the Association of the inquiries into the Brighton Corporation Tramways and Croydon Corporation Tramways, a brief history of the tramway strike at Newcastle, and notes on the proceedings of the National Joint Industrial Council for the Tramways Industry.

Great Eastern Railway and Electrification.—Mr. Neal, in reply to a question in the House of Commons on May 3, said that he was aware of the traffic congestion at certain hours in districts radiating in a north-easterly direction from the city. He had been in consultation with the Great Eastern Railway and had informed the company that the Trading Facilities Committee were prepared to consider an application from them for assistance in raising capital for electrification work, but he understood that they did not intend to make such an application. This statement does not mean that electrification is not to be undertaken. Sir Henry Thornton, general manager of the Great Eastern Railway, has explained that the company have under consideration other means for obtaining funds for electrification. Plans for this purpose have been under advisement for some time, and it will probably be found that the Great Eastern Railway will not lag behind other systems which are now about to proceed to electrify some of their lines. Sir Henry Thornton, before coming to the Great Eastern Railway, was general manager of the Long Island Railway, New York, which electrified their system some years ago with results that were very satisfactory both to the railway company and to the public. Sir Henry Thornton is consequently well aware of the great improvements which can be effected by the transport facilities in the Eastern and North-Eastern suburban districts.

PERSONAL.

Lieut.-Colonel J. A. Cole, deputy chairman and managing director of Humber, Ltd., has been elected president of the Society of Motor Manufacturers and Traders, in succession to Sir Alfred Mays-Smith.

Mr. H. H. Lancaster, executive officer of Blackpool Corporation Tramways, has been appointed traffic superintendent of the undertaking, in succession to Mr. Charles I. Baker, now manager of Ashton-under-Lyne Corporation tramways. There were 58 applicants for the Blackpool vacancy.

Councillor W. G. Turner, chairman of the Belfast City Tramways Committee, and an ex-High Sheriff of the city, has been honoured with a civic presentation in recognition of his distinguished municipal services. Councillor Turner has for many years served on the City Council, and in 1920 he was unanimously elected High Sheriff. At the City Hall on April 27 he was presented with two portraits of himself—one for inclusion in the permanent gallery at the City Hall and the other for his own home. In addition, Councillor Turner received an illuminated address, in album form, while Mrs. Turner was the recipient of a diamond and sapphire cluster ring. The Lord Mayor and Lady Mayoress and many of Councillor Turner's colleagues and friends were present at the ceremony and paid eloquent tribute to his work for Belfast.

Mr. C. I. Baker entered upon his duties as manager of the Ashton-under-Lyne Corporation tramways on May 1. Prior to his departure from Blackpool he was presented by Councillor H. Brooks (chairman of the Electricity and Tramways Committee) on behalf of the Electricity and Tramway Employees' Institute, with a cheque. The tramway employees have presented Mr. Baker with an oak grandfather's clock.

Mr. E. S. Rayner, general manager of Hull Corporation tramways, was recently offered by the Committee a salary of £1,200 per annum as from July 1 next, rising by three annual increments of £100 to £1,500, such salary not to carry any bonus. Mr. Rayner, whose present basic salary is £800 with bonus, declined the offer. It will be recalled that he was one of the three candidates recently interviewed by Manchester Tramways Committee with a view to the appointment of general manager in that city, and that the position was filled by the appointment of Major H. Mattinson.

FINANCIAL.

Rochdale Corporation Tramways show a loss for the year ended March 31 of £19,500.

English Electric Company, Ltd.—The directors recommend a dividend of 5 per cent. on the ordinary shares for 1921, as compared with 8 per cent. for the previous year.

Mexborough and Swinton Tramways Company have declared a dividend of 2½ per cent., free of tax, for the year. A sum of £2,000 is placed to the reserve and renewals account, and £246 is carried forward.

Bury Tramways Loss.—The draft annual balance sheet of Bury Corporation tramways shows a loss on working during the last 12 months of £12,461 on the Bury sections, £1,943 on the Radcliffe section under the first agreement, and £913 17s. under the second agreement.

Pinchin, Johnson & Co., Ltd.—The net profits for 1921 were £45,924, and £10,588 was brought forward. A final dividend of 2½ per cent. is proposed on the ordinary shares, making 7½ per cent. for the year, writing £1,500 off preliminary expenses, and carrying forward £16,512.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended May 3 amounted to £94,117, a decrease of £12,093 compared with the corresponding period of last year. The route length was 155.91 miles, as compared with 152·26 a year ago. From April 1 (the commencement of the financial year) to May 3 (4⅕ weeks), the total receipts were £435,517, a decrease of £42,842 on the corresponding period of 1921.

Gateshead and District Tramways Company.—The annual report shows that the revenue for 1921 was £141,803. After deducting all expenses, including provision for renewals (£3,000), there remains £43,818 plus £2,018 brought forward, making £45,836. The directors recommend placing to the sinking fund for redemption of mortgages £3,172, dividend on ordinary shares at the rate of 10 per cent. (on account of which 4 per cent. has been paid), carrying forward £22,407. Expenditure on capital account amounted to £49,416, making entire capital outlay upon the undertaking £412,341.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended April 22 give total receipts of £368,640, or £8,881 more than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £189 4s. 9d. per mile of single track, and last year at the rate of £184 13s. 7d., thus showing an increase for the week of £4 11s. 2d. per mile open. For the previous 16 weeks a decrease has been recorded, and the increase this week is mainly attributable to the Easter traffic.

CONTRACTS.

Aberdeen Town Council propose to purchase two 6-ton Leyland motor lorries at £1,130 each.

Tilling-Stevens Motors, Ltd., are supplying a double-deck omnibus to Blackpool Watch Committee.

Salford Electricity Committee have ordered from the Metropolitan-Vickers Electrical Company, Ltd., two 6,000-volt switch cubicles.

Newport (Mon.) Tramways Committee have accepted the following tenders:—Messrs. Wettern Bros., for 300 tons of setts; Messrs. Walter Scott, Ltd., Leeds, for 250 tons of rails.

Welsh Highland Railway.—Messrs. M'Alpine have secured the contract for the construction of the Welsh Highland Railway for a sum of nearly £60,000. It is expected that the section between Dinas and Beddgelert will be completed by Whitsuntide, and that from Beddgelert to Portmadoc by July.

Johannesburg Municipal Council have accepted the tender of Hadfields, Ltd., for the supply of 500 standard tyres for tramway cars at £4 4s. 3d. each (total value, £2,106 5s.), and of the Continental and Colonial Commercial Co., Ltd. (lowest), for the supply of 20 rolled steel tyres for pony wheels of bogie tramcars, at £2 17s. 6d. each (total value, £57 10s.).

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TENDERS INVITED.

COUNTY BOROUGH OF BELFAST.

Tramways Department.

The Tramways Committee invite Tenders for the supply of 4 Junctions and 12 Crossovers.

Particulars, etc., may be obtained on application to Mr. J. S. D. Moffet, Tramways Department, Napier Street, Sandy Row, Belfast.

The Committee do not bind themselves to accept the lowest or any Tender. The whole or any part of a Tender sent in may be accepted.

Tenders must be received by the undersigned at the City Hall, Belfast, not later than 12 o'clock noon on Friday, May 19, 1922.

R. MEYER,
Town Clerk.

City Hall, Belfast.
May 3, 1922.

BELFAST CITY TRAMWAYS.

Reconstruction of Permanent Way.

The Tramways Committee of the Belfast Corporation invite Tenders for the Reconstruction of the Permanent Way under two alternative schemes :—

"A" for about 10 miles, and
"B" " " 3¾ " } of Single Track.

Specification, Conditions of Contract, Quantities and Forms of Tender can be obtained from Mr. J. S. D. Moffet, General Manager, Corporation Tramways, Sandy Row, Belfast, on payment of a Deposit of 5 guineas, which will be returned on receipt of a *bona fide* Tender.

Amongst the special conditions to be observed are :—

(1) Full service to be maintained during the progress of the work.
(2) Work to proceed at the rate of half a mile per week.
(3) For ordinary labour preference to be given to the unemployed ex-Service men in the City.

Tenders on the Official Forms, in sealed envelopes endorsed "Permanent Way Reconstruction" must be received by the undersigned not later than 12 o'clock noon on Friday, May 19, 1922.

The Council do not bind themselves to accept the lowest or any Tender.

R. MEYER,
Town Clerk.

City Hall, Belfast,
May 3, 1922.

COUNTY BOROUGH OF NORTHAMPTON.

Uniform Clothing, etc.

The Tramways Committee are prepared to receive Tenders for Inspectors', Motormen's, Conductors' and Parcel Boys' Uniform Clothing. Sample garments can be examined at the above offices.

The Committee do not bind themselves to accept the lowest or any Tender.

Quotations, endorsed "Tender for Uniforms," should reach me not later than Friday, May 12, 1922.

JOHN F. CAMERON,
General Manager.

Tramways Office,
St. James', Northampton.
April 19, 1922.

BUILDINGS (Wood), 60 ft. by 15 ft., 30 ft. by 15 ft., 150 ft. by 30 ft., 75 ft. by 30 ft., and 55 ft. by 30 ft.; delivered on quay at Liverpool or Preston.—INSULAR TRADING CO., LTD., Douglas, I.O.M.

ELECTRIC TRAMCAR HANDBOOK for Motormen, Inspectors and Depot Workers. By W. A. AGNEW. 132 pages, 7 in. by 4½ in. Cloth. Price 3/6. Postage 4d.—THE TRAMWAY AND RAILWAY WORLD Offices.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London,
W.C.2

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	April 26	3,622	3,299	— 323	47¾	165,674	— 14,376
" Motor Buses	" 26	60	149	+ 89	47¾	10,426	+ 8,757
Ayr Corporation ..	" 29	658	629	— 29	50	34,195	— 2,754
Barrow Corporation ..	" 29	927	575	— 352	4	2,482	— 976
Belfast City	" 28	13,214	11,967	— 1,247	4	48,504	— 2,790
Birkenhead Corporation	" 30	2,566	2,534	— 32	4¾	10,804	— 523
" Motor Buses	" 30	609	668	+ 59	4¾	2,899	+ 510
Birmingham Corporat'n	" 22	29,877	28,495	— 1,382	3	89,950	— 11,660
" Motor Buses	" 22	1,865	1,931	+ 66	3	5,568	— 1,038
Blackburn Corporation	" 26	2,523	2,286	— 237	4½	10,816	— 1,519
Bradford Corporation..	" 29	15,108	13,775	— 1,333	5	58,814	— 3,513
Burnley Corporation ..	" 29	1,448	3,184	+ 1,736	..	..	.
Burton-on-Trent Corp.	" 30	605	554	— 51	4	2,323	— 292
Bury Corporation ..	" 30	2,878	2,419	— 459	4½	10,596	— 1,350
Chatham & District ..	" 20	1,525	1,887	+ 362	16	23,570	— 2,542
Chesterfield Corporat'n.	" 24	1,327	1,238	— 89	3	4,503	— 347
Derby Corporation ..	" 29	2,328	2,011	— 317	4	8,867	— 1,107
Dundee City ..	" 26	3,358	2,895	— 463	49½	155,235	+ 2,450
East Ham Corporation	" 29	2,0..8	2,097	+ 69	4½	9,046	+ 349
Edinburgh Corp. Trys.	" 22	..	11,856	..	49	608,035	— 42,191
" Motor Buses	" 22	..	3,890	..	49	171,623	..
Glasgow Corporation ..	" 29	50,000	44,588	— 5,412	47½	2,140,980	— 17,750
Glossop (U.E. Sup. Co.)	" 29	252	217	— 35	17	3,885	— 155
Halifax Corporation ..	" 25	4,103	3,994	— 109	3½	15,424	— 273
" Motor Buses	" 25	102	57	— 45	3½	213	— 183
" Railless Cars	" 25	..	52	..	3½	210	...
Huddersfield Corporatn.	" 29	5,657	5,012	— 645	5	26,378	— 1,063
Ilford U.D. Council ..	" 29	1,525	1,466	— 59	4½	6,252	+ 196
Ipswich Corporation ...	" 29	876	732	— 144	4	3,335	— 139
Isle of Thanet ..	" 26	695	814	+ 119	29½	18,720	+ 760
Kilmarnock Corporat'n	" 29	372	322	— 50	49¾	17,507	— 915
Leicester Corporation..	" 29	5,761	7,257	+ 1,496	17	122,109	+ 12,316
Liverpool Corporation	" 29	25,198	28,958	+ 3,760	17	489,012	+ 13,811
London County Ccl. ..	May 3	106,210	94,117	— 12,093	4½	435,517	— 42,842
Maidstone Corporation	April 27	441	400	— 41	3½	2,123	— 105
Manchester Corp. ..	" 29	40,607	36,955	+ 3,652	4	154,120	— 4,596
Newcastle-on-T. Corp.	" 29	10,874	9,519	— 1,355	4	41,500	— 3,917
Nottingham Corp.	" 27	5,976	7,456	+ 1,480	4	29,760	+ 1,710
Oldham Corporation ...	" 24	4,212	4,908	+ 696	4	19,915	— 784
Preston Corporation ...	" 26	1,717	1,767	+ 50	3½	6,721	— 515
" Motor Buses	" 26	..	123	..	3½	488	..
Reading Corporation ..	" 27	1,531	1,495	— 36	4	5,968	— 158
" Motor Buses	" 27	301	317	+ 16	4	1,309	+ 151
Rotherham Corporation	May 1	2,118	2,117	— 1	4	8,724	+ 257
Salford Corporation ..	April 30	11,557	10,171	— 1,386	4¾	43,890	— 2,783
Sheffield Corporation..	" 30	18,083	18,090	+ 7	4¾	77,172	— 4,743
Southampton Corp. ..	" 26	2,706	3,035	— 329	4	11,067	— 550
" Motor Buses	" 26	168	103	— 65	4	377	— 46
Southend-on-Sea Corp.	" 26	1,592	2,148	+ 556	4	8,595	+ 1,695
South Shields Corp. ..	" 29	1,449	1,655	+ 206	4	7,117	+ 797
St. Helens Corporation	" 25	1,671	1,496	— 175	4	5,715	— 529
Sunderland Corp. ..	" 30	2,034	2,306	+ 272	4	10,485	— 58
Swindon Corporation..	" 26	374	343	— 31	3½	1,309	— 135
Tyneside Trys., Trds...	" 19	1,025	1,467	+ 442	16	13,001	— 6,034
Wallasey Corp. .	" 29	2,785	2,523	— 262	4½	10,009	— 955
" Motor Buses	" 29	239	196	— 43	4½	940	+ 57
Walsall Corporation ..	" 29	1,628	1,556	— 72	4	7,058	— 119
" Motor Buses	" 29	839	817	— 22	4	4,042	+ 130
Walthamstow U.D.C....	" 29	2,114	1,769	— 344	4½	7,786	— 340
Warrington Corp. .	" 27	1,041	981	— 60	4	3,974	— 156
West Ham Corp. ..	" 27	6,106	5,523	— 583	3¾	22,409	— 1,660
Wolverhampton Corp.	May 3	2,342	2,024	— 318	5	10,706	— 155
" Motor Buses	" 3	620	611	— 9	5	3,223	+ 339

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1921.	1922.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..	April 29	£81,423	86,630	17	£1,421,179	+ 53,598
Ballarat & Ben. (4 wks.)	Feb. 26	4,701	4,797	48	55,454	+ 3,216
Brazilian Traction (Mlrs)	Feb.	11,941,000	14,473,000	8	29,505,000	+ 4,689,000
Brisbane ..	Mar.	46,300	51,300	13	143,890	+ 8,105
British Columbia $	Mar.	867,083	849,680	39	7,771,665	+ 140,144
Buenos Aires Lacroze ..	Mar.	59,365	61,775	39	521,819	+ 11,105
Burmah Tr. & Lght. Rs.	Mar.	50,931	60,926	34	463,423	+ 55,324
Calcutta .. Rs.	April 30	86,280	107,116	17	1,804,821	+ 645,547
Cape Town	Mar.	..	29,930	.		..
Carthagena & Herrerias	April	2,329	2,991	17	10,984	— 287
Cordoba	Jan.	18,696	22,152	43	230,068	+ 32,934
East India	April	4,560	4,065	39	37,082	— 905
Kalgoorlie ..	Jan.	2,418	2,180	4	2,180	+ 32
La Plata ..	Mar.	* 3,403	7,067	13	20,109	+ 9,47[illegible]
Madras (2 weeks) Rs.	April 30	49,668	48,592	17	396,179	+ 151,290
Manila .. .. $	Mar.	298,317	284,576	13	903,829	— 22,255
Montevideo	Mar.	48,925	51,158	21	231,459	— 9,229
Para	Mar.	22,189	22,238	17	89,446	— 1,772
Pernambuco	April 30	3,594	3,281	17½	62,179	— 14,555
Port Elizabeth	Mar.	..	7,851	..	..	..
Rangoon .. Rs.	Mar.	158,121	150,500	13	418,933	+ 17,536
Shanghai .. $	Jan.	155,705	180,635	4	180,635	+ 24,930
Singapore .. $	Mar. 11	14,274	14,451	10	151,287	+ 36,159
Winnipeg . $	Mar.	495,208	464,900	13	1,436,334	— 25,228

* Strike of employees

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

COMMON FUND COMPANIES.		
Metropolitan District Rly. Co. ..	Week ending April 29, 1922 ..	£229,211
London Electric Rlv. Co.	Corresponding week last year ..	240,293
City & South London Rly. Co. ..	Decrease	11,082
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	3,629,718
London General Omnibus Co., Ltd.	Corresponding period last year ..	3,908,421
	Decrease	278,703
LONDON & SUBURBAN TRACTION GROUP	Week ending April 29, 1922 ..	£50,223
Metropolitan Elec. Tramways, Ltd.	Corresponding week last year ..	55,342
London United Tramways, Ltd.	Decrease	5,119
South Met. Elec. Tr. & Ltg. Co., Ltd.	Aggregate from Jan. 1 to date ..	796,542
Tramways (M.E.T.) Omnibus Co., Ltd	Corresponding period last year ..	866,761
Gearless Motor Omnibus Co., Ltd.	Decrease	70,219

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending April 29, 1922 ...	£33,195	£3,887	£37,082
Total Receipts (17 weeks) ...	559,152	63,876	623,028

MERSEY RAILWAY			
Week ending April 29, 1922 ...	—	—	£4,143
Total Receipts (17 weeks) ..	—	—	79,142

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THE
Tramway AND Railway World
FOUNDED IN 1892.

OFFICES:—AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.2.

Telephone No.: GERRARD 2948.
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THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

LONDON, MAY 13, 1922.

LOCAL VETO AGAIN STOPS PROGRESS.

The withdrawal of the clause in the London County Council Bill which would have enabled the Council to provide a railless trolley car service between West Norwood and Lee Green calls attention to a deplorable weakness in legal procedure of this kind. It will be remembered that among the proposals of the Council for improving their tramway system was the introduction of this railless route, eight miles in length, which, passing from near the Crystal Palace through Sydenham and Catford to Lee Green, would have afforded an important cross-town connection. In conjunction with existing tramway routes, it would have given facilities to areas at present inadequately served, and would also have met the needs of two large housing estates. The scheme had been carefully propounded by the Highways Committee, after consultation with two other important committees of the County Council, and had received the approval of the parent body. As soon as the proposals were made known, however, Lewisham Borough Council, through whose area part only of the route would have lain, immediately rose in arms. In consequence of their opposition, a small majority of the House of Commons succeeded in ensuring that a clause was inserted in the Bill empowering the local council to veto the erection of the necessary equipment. This is by no means the first instance where a municipal body, responsible only for one district, has stood in the way of a desirable improvement intended to benefit the general public in a much larger area, and not merely the people who happened to live on a section of the line of route. It might fairly be asked what right has a local body to come forward in such circumstances and force its own parochial view on the larger public as a whole? The London County Council is the principal civic authority charged with providing transport facilities for the Metropolis, and to say the least, it appears irregular and inconsistent that one of the constituent boroughs, which itself has several representatives on the county authority, should obstruct a measure designed to afford a direct and speedy means of crossing its own at present ill-served district. Take the case of Edinburgh. Here the Town Council decided on a certain course of action in relation to their tramway electrification scheme—the erection of centre poles in Princes Street. A section of the local public, not content with what their own representatives had decided for them, raised objections which culminated in a Government inquiry. After this expense had been incurred, the Ministry of Transport declined to over-rule the Corporation, whose original intention will now be acted upon. If overhead electrical equipment is permissible in a thoroughfare of the character of Princes Street, the London County Council can hardly have committed an outrage in suggesting that it would not ruin the amenities of Lewisham. It is high time that the whole law relating to the powers of veto invested in subsidiary local bodies were revised.

LONDON TRAFFIC ORGANISATION.

URGENT RECOMMENDATIONS BY L.C.C. HIGHWAYS COMMITTEE.

At the meeting of the London County Council on Tuesday the Highways Committee submitted a long and important report on London traffic organisation. The immediate occasion of the report is the proposed Government guarantee in connection with the development of the existing underground tube railways. The committee consider that the moment is an opportune one for the Council to review the whole position, not only as regards the effect of the present unsatisfactory arrangements from the point of view of the interests of the Council's tramways undertaking, but also in relation to the general traffic needs of London as they affect the Council in its responsible position as the central local traffic authority for the area.

The committee recapitulate the action which has been taken by the Government from time to time, and enumerate briefly the proceedings of the Royal Commission on London Traffic, 1903-1905; the Select Committee on Motor Traffic, 1913; the Select Committee on Transport (Metropolitan area), 1919, and the Advisory Committee on London Traffic, 1920. These different commissions and committees, while not always in accord on questions of method or machinery, were in complete agreement in the view they took as to the urgency of the question of reorganising London traffic and as to the necessity of some new body being set up, entrusted with the duty of co-ordinating the present arrangements.

The committee then give a summary of the action taken by the Council in the matter from 1901-1920. In the latter year a long series of discussions took place between representatives of the Ministry of Transport, the Council, and the Underground Group of Companies, as a result of which two principles emerged in regard to which there was general agreement. These were:—

(i) The necessity for the unified operation of local passenger transport services in London and adjacent districts, and

(ii) The desirability of setting up a traffic control authority, pending the settlement of the question of the reorganisation of local government in London and adjacent districts.

In May, 1921, the Council passed resolutions confirming these principles and urging the Government to introduce legislation on the lines indicated. This was done, but the Government has not stated what action it intends to take. Since the report of May, 1921, was presented to the Council a Royal Commission on London Government has been appointed to inquire into the whole question of local government in London. This Commission is now sitting and evidence has been submitted to it by the Council, including the question of traffic arrangements in the area affected. The committee point out that a long time must necessarily elapse before any tangible results are achieved from the inquiries of this Commission, and they view any prolonged continuance of the present state of affairs with such grave apprehension that they consider that the Council is fully justified in adhering to its proposals for dealing at once with the reorganisation of existing traffic arrangements. On the other hand, since these proposals were put forward by the Council negotiations have taken place between the Government and the Underground Group of Companies regarding special facilities sought by the latter. These negotiations raised the question of the relations between the Council as the tramway authority for the County, and the Group which controls the greater part of the privately-owned transport facilities in London and surrounding districts.

The committee feel that it is desirable, therefore, to indicate the position occupied by the Council, the particular difficulties it meets in carrying out its duties as the tramways authority, what is the constitution of the "Combine" group and the nature of its competition with the Council's tramways, and the bearing on the operations of both traffic undertakings of the assistance which has been and is being furnished by the Government to the "Combine" from time to time. Much information is included in the committee's statement with regard to the need for development, traffic and financial considerations, the effect of competition, and the Underground Group of London traffic undertakings, with special regard to organisation and the relations between the Government and the Traffic "Combine." The committee conclude that the competition now going on between the Council's tramways and

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the various transport undertakings in the Underground Group serves no useful purpose. This competition entails serious financial risk to the ratepayers of London and the shareholders in the competing companies, without furnishing any commensurate advantage to the public. It is maintained that with proper supervision and co-ordination the legitimate interests of both sides and of the travelling public may be benefited.

Without such co-operation the committee see little hope of any effective remedy for the present state of affairs. They regard the matter as one of such pressing urgency that they advise the Council to place the position before the Government and to ask it to take the matter in hand without delay. They refrain from indicating ways or means, feeling that this might hamper the Government in dealing with the question and become the ground for further delay. In expressing this view they make it clear that in their opinion whatever steps may be taken to secure co-ordination of the existing traffic arrangements in Greater London should be regarded as of a temporary character, until such time as the question of the reorganisation of local government in London and adjacent districts shall have been determined.

The report gave rise to a long debate, which was not concluded when the Council adjourned.

LONDON TROLLEY VEHICLE SCHEME ABANDONED.

SELECT COMMITTEE APPROVE TRAMWAY EXTENSION.

A Select Committee of the House of Commons, presided over by Mr. Ormsby-Gore, on Wednesday considered the London County Council (Tramways, Trolley Vehicles, and Improvements) Bill. When the Bill received its second reading it contained a proposal that powers should be given to construct a trolley vehicle route from West Norwood to Lee Green, but the Select Committee was informed on Wednesday that, as the local authority—the Lewisham Borough Council—had exercised its right of veto, that part of the scheme had been dropped. The remainder of the Bill was concerned with the construction of an electric tramway of about five-eighths of a mile along Amhurst Park, connecting the L.C.C. tramway at Stamford Hill and that of the Metropolitan Electric Tramways Company (who opposed the Bill) in Seven Sisters Road. It was explained that the local authorities concerned desired that the tramways should be made. The only opposition came from the Metropolitan Electric Tramways Company, with whose line in Seven Sisters Road it was proposed to make a junction.

The Chairman said the committee had unanimously agreed to pass the preamble of the Bill. If the ground for the rejection of the Bill was to be congestion, the committee would have expected that the Ministry of Transport and the police authorities would have had some observations to make, but no such observations had been made. It did not seem that the Metropolitan Company had made out that their property would be damaged, or in any way rendered less valuable or productive. The committee, therefore agreed to the Bill.

L.C.C. TRAMWAY MATTERS.

At the London County Council meeting on Tuesday a number of tramway reports were submitted, including the following :—

MOTORMEN AND CONDUCTORS WHILE LEARNING.—At present candidates for positions of motormen and conductors while learning receive certain allowances for periods not exceeding six weeks in the case of motormen and two weeks for conductors. Motormen are granted 3s. 6d. a day basic rate, plus 4s. 2d. a day war wages, a total of 7s. 8d. a day, and conductors 3s. 6d. a day basic rate, plus 1s. 6d. a day war wages, a total of 5s. a day. The temporary additions have been reduced by 1s. 4d. a day, and the Highways Committee now advise that the allowances should be revised as follows: Motormen, 3s. 6d. a day basic rate, plus 50 per cent. of the temporary addition paid to motormen; conductors, 3s. 6d. a day basic rate, plus 1s. 6d. a day temporary addition, until such time as the temporary addition to conductors is reduced to less than 3s. a day, when they will receive 50 per cent. of the temporary addition payable to conductors.

GREENWICH POWER STATION.—At various times the Council have approved capital estimates in respect of the provision at Greenwich power station of (1) an additional condenser water pipe and alterations and additions to plant at the station; (2) a spare alternator and rotor; and (3) oil burning plant. The works have now been completed, but the estimates have been exceeded by small amounts, in the case of (1) £361, (2) £595, and (3) £255, the expenditure being accounted for by increases in the cost of labour and materials during the execution of the work.

QUARTERLY REPORT ON TRAMWAY MATTERS.

From the report of the action taken during the three months, January 1 to March 31, by the Highways Committee, the following items are extracted :—

The committee have decided to meet on alternate Thursdays at 2.30 p.m. as hitherto. They have appointed two sub-committees, the Tramways Management and General Purposes Sub-Committee, who will meet alternately with the committee on Thursday afternoons, and the Works and Equipment Sub-Committee, who will meet on alternate Wednesday afternoons, at 2.30 p.m. The sub-committees are composed as follows :—

Tramways Management and General Purposes Sub-Committee: Mr. G. Davies, Mr. T. C. E. Goff, the Earl of Haddo, Mr. G. H. Hume, Captain G. E. Pierrepont, Captain O. Wakeman, Mr. Henry Ward and Mr. W. J. Webb.

Works and Equipment Sub-Committee: Mr. F. Bertram Gale, Mr. E. H. Kemp, Mr. S. March, Mr. W. J. Morton, and Mr. F. W. Raffety (one vacancy).

Among the expenditure that has been sanctioned are the following items :—Re-winding of armatures, £1,650; removal of refuse from the tramway conduits for a period of twelve months, £11,000; purchase of 2,000 trailing wheel tyres, £3,600; supply of 1,317,500 creosoted deal paving blocks for the maintenance of the permanent way, £23,200.

The committee settled 573 claims against the Council in connection with the working of the tramways, and in 15 other cases actions were brought against the Council; in eight of these a verdict was given against the Council, and a total of £1,276 had to be paid; one case was withdrawn, and in the remaining six cases the action resulted in the Council's favour.

In connection with the purchase by the Council of the portion in London of the tramways of the London United Tramways, Ltd., 45 tramcars were taken over, and the Council not requiring these, the committee have arranged for the invitation by public advertisement of tenders for their purchase.

An expenditure not exceeding £100 was sanctioned for the treatment of a number of steel tramway tyres by the "Sorbitic" process, with a view to ascertaining whether the life of the tyre can be extended.

As an experiment, all-night services have been arranged from Blackfriars to Water Lane and Savoy Street, Strand, to Tooting Broadway respectively, traversing the whole length of Victoria Embankment.

The committee have approved certain alterations in the issue of uniform clothing to motormen and conductors, as a result of which it will be possible in future to provide the men with trousers without incurring any additional expenditure on equipment.

The Highways Committee have arranged for the provision of free travelling facilities on the Council's tramways for delegates attending the Institute of Transport Congress, May 17 to 19.

THROUGH RUNNING.

Replying to Mr. J. D. Gilbert, M.P., Mr. C. W. Matthews (chairman of the Highways Committee) said it was not at present intended to operate a direct service between the Embankment and Hampton Court, one reason being that as the London United Company's cars ran over a part of the system, the average speed of the cars in London would be reduced.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

PROGRAMME OF ANNUAL CONGRESS.

The following programme of the fourteenth annual congress of the Tramways and Light Railways Association, to be held at Bournemouth on June 22 and 23, 1922, is given in the Journal of the Association for May :—

THURSDAY, JUNE 22.

10 a.m.—Reception by the Mayor of Bournemouth, at the Town Hall.

10.30 a.m.—Town Hall: Opening of Congress.
"Bournemouth Corporation Tramways." Paper by Mr. I. Bulfin, M.A., M.Inst.C.E., M.I.E.E., M.I.Mech.E.
"Railless Traction." Paper by Mr. E. M. Munro, M.I.E.E., M.I.Mech.E
Discussion.
In connection with Mr. Bulfin's paper there will be a demonstration of the Sandberg "In-situ" rail hardening process at the depot during the morning.

1.15 p.m.—Luncheon at Town Hall. Members will be the guests of the Mayor.

2.30 p.m.—Excursion by motor omnibus to various points of interest in and around Bournemouth, finishing at Christchurch Priory. Tea at Cuckton Creaks at the invitation of Mrs. Bulfin.
Informal dinner at Norfolk Hotel.

FRIDAY, JUNE 23.

10.30 a.m.—Town Hall.
25th ordinary general meeting of the Tramways and Light Railways Association.

11 a.m.—"Modern Improvements in Tramway Rolling Stock." Paper by Mr. C. J. Spencer, O.B.E., M.I.E.E.
Discussion.
Lunch at Norfolk Hotel.
Arrangements will be made for excursions to the New Forest by motor coach, at special rates.

7 for 7.15 p.m.—Members' dinner. The Mayor and other members of the Bournemouth Corporation will be the Association's guests.

A reserved restaurant car for the use of members of the Association will be attached to the 6.30 p.m. train from Waterloo Station on Wednesday, June 21, and by the kind permission of Mr. I. Bulfin, general manager of the Bournemouth Corporation tramways, conveyances will meet the train to take members and their luggage to the Norfolk Hotel, the headquarters of the Association.

Members are asked to communicate with the Secretary, Mr. A. de Turckheim, Caxton House, Tothill Street, Westminster, S.W.1, at an early date to enable him to complete arrangements (seats on train, rooms required, etc.).

Trial Run on Edinburgh Electrified System.—The first trial of the new electric cars of Edinburgh Corporation tramways on the Liberton and Goldenacre routes took place early on Sunday morning last, with satisfactory results. The car started from the Leith depot and stopped at Pilrig, where the convener of the Tramways Committee (Councillor C. J. M. Mancor) switched on the current, thereby connecting the Leith system with that of Liberton and Goldenacre. When the car returned to the depot congratulations were extended to the manager (Mr. R. S. Pilcher) and his staff on the prompt and efficient way in which the electrification of this first section had been carried out.

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MISCELLANEOUS NEWS AND NOTES.

Hull Tramway Extension Vetoed.—The Ministry of Transport has refused the application of the Hull Corporation for a Light Railway Order enabling them to run a tramway service between the Hull city boundary and the town of Hessle.

Reduction of Bristol Fares.—The fares of the Bristol Tramways and Carriage Company were revised on Monday last. The minimum fare was reduced from 2d. to 1½d., which had been the minimum until February last year. Workmen's fares were lowered, and special rates were granted to children from 3 to 12 years of age.

Development of New York Subways.—According to a Central News message from New York the Transit Commission has announced a great project for the construction of new subways in five boroughs of New York City. The building of the lines will cost about 218,000,000 dols., and the equipment, including power houses, etc., 100 million dols.

Magistrate and Tramway Employees' Lost Time.—In a case at Marylebone Police Court, when a man was fined 18s. for assaulting the conductor of a tramcar of the Metropolitan Electric Company, he and the driver, who was a witness, asked the magistrate to allow them costs for the loss of time. The Magistrate: Do you mean to say that the tramway companies do not pay you when you have to attend court to give evidence? The conductor replied that they would have to lose a day's work and pay. The Magistrate: Well, that seems to me a most extraordinary and high-handed thing on the part of the company. He ordered defendant to pay the conductor and driver 12s. each as costs.

Tramways not to be Superseded.—Mr. J. B. Hamilton, presiding at the meeting of the Bath Electric Tramways, Ltd., on Wednesday, said that during his journey round the world he had been able to advance his knowledge as a transport man of what is being done in other countries. He wanted to say straightaway that those who had invested their money in tramways of this country need have no fear that such undertakings would be superseded by other forms of traction. In all cities of the world where the electric tramcar was practically doing the work of transportation it was in his view likely to continue to do so for many years to come. Alluding to the successful year through which the company had passed, he reminded the shareholders that practically the whole of the increase in receipts, which constitutes a record, must be ascribed to the increase in fares which they were permitted to make under the order granted by the Ministry of Transport in accordance with the terms of the Tramways (Temporary Increase of Charges) Act, 1920. The increase was intended to provide for the increased cost of labour and materials, and it must not be considered that a larger net revenue necessarily followed.

West Ham Tramway Fares.—Mr. M. L. Slattery, general manager of West Ham Corporation tramways, recently presented two reports to his committee—one on the operation of the 2d. maximum mid-day fare, and the other on fares generally, to both of which brief reference was made in our issue of April 29. In the first report he gives statistics which show that after allowing for assumed "economic" loss, due to the present condition of trade, there was an increase in the number of 2d. passengers of 615,697, and a decrease of 3d. and higher fares of 788,789 for the 33 weeks to March 30 last, representing a fall in revenue of £6,464, equivalent to £10,085 for a complete year. It cannot be claimed, Mr. Slattery adds, that the operation of the 2d. mid-day fare has been the success the Council anticipated. In his report on fares generally the manager cites the falling off in traffic on various tramway and railway systems, and remarks that it appears that this decrease is universal and must be primarily attributed to the present economic conditions. He is strongly of opinion that any curtailment or concessions in fares at West Ham could only result in a deficiency which would have to be made up from the Rate Account. Having regard to the financial position of the undertaking and the uncertainty of the future he cannot recommend any alteration in fares at the moment.

Transport Ministry and Princes Street, Edinburgh.—The report of Sir William Marwood and Colonel Pringle on which the Transport Ministry has already authorised the erection of centre poles in Princes Street, Edinburgh, has now been published. Generally speaking, the report says, the inquiry resolved itself into a question of the respective merits of centre pole construction and the conduit system. It was not denied (it is pointed out) that the conduit system was more expensive to instal and also to operate. "Although some deduction may be made from the additional cost of the conduit system as estimated by the Corporation, we think that an estimate of, say, £12,000 as a total additional annual cost under all heads might reasonably be anticipated. This would represent an increased cost, based on the present service of the cars, of rather more than 3½d. per car mile run in Princes Street." Dealing with the question of practicability or reliability of the two systems, the report states that "there is not much to be said," and referring to the effect of centre poles on other traffic, the document asserts that in view of the width of Princes Street the traffic objections are not insuperable. As regards the question of amenity, the report says: "It is impossible to fix any monetary value for amenity . . but, taking all circumstances into consideration, we have come to the conclusion that we cannot recommend you to refuse the permission which the Corporation ask." It is suggested, however, that the Corporation should consider the position of certain refuge platforms in the street, and the distance between the poles might be extended to 50 yards where it would facilitate the passing of traffic out of the side streets.

The London "Safety First" Council has issued a poster announcing an offer of a prize of five guineas for the set of verses judged by them to be the most suitable for use in conjunction with the Safety First one-step (by Phil Davis). The verses, the number of which is optional, should be topical and must reflect the advice and principles embodied in the posters issued by the "Safety First" Council. The name and address of the winner will be announced in the Press, and the copyright of the winning verses will become the property of the publishers. Entries should be addressed to the London "Safety First" Council, 15, Savoy Street, W.C.2.

PERSONAL.

Sir Ernest Rutherford, K.B.E., F.R.S., will deliver the thirteenth Kelvin lecture on "Electricity and Matter" on May 18, at 3 p.m., at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2.

Mr. H. H. Lancaster, executive officer of Blackpool Corporation tramways, who has been appointed traffic manager in succession to Mr. C. I. Baker, will receive a salary of £400 a year, with bonus, making not more than £500. Many of our readers will remember that Mr. Lancaster's father, the late Mr. James Lancaster, was for many years general manager of the Blackpool tramways.

CONTRACTS.

The Premier Electric Welding Company, Ltd., of Abbey Wood, London, S.E.2, have received an order from the London County Council tramways department for two complete "Premier" electric arc welding equipments of the self-contained motor-generator type.

Sheffield City Council proposed to place an order with Steel, Peech & Tozer, Rotherham, for 200 tons of steel tramway rails at £12 10s. per ton. The firm, however, approached the Tramways Committee with a view to increasing the order, and it is now proposed, subject to confirmation by the City Council, to give them an order for 500 tons at £11 10s. per ton.

FINANCIAL.

Hurst, Nelson & Co., Ltd.—An interim dividend is announced of 1s. per share, free of tax, on the ordinary shares.

Siemens Bros. & Company, Ltd., announce a final dividend of 1s. per share, free of tax, making 10 per cent. for the year.

J. I. Thornycroft & Co., Ltd.—An interim dividend of 3 per cent., less tax, on the cumulative preference shares will be paid for the year ending July 31, 1922.

Dorman, Long & Company, Ltd., announce a dividend on the preference shares at the rate of 8 per cent. per annum, less tax, for the half year ended March 31, 1922. No interim dividend has been paid on the ordinary shares.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended May 10 amounted to £97,969, a decrease of £4,319 compared with the corresponding period of last year. The route length was 160·73 miles, as compared with 152·52 a year ago. From April 1 (the commencement of the financial year) to May 10 (5½ weeks), the total receipts were £533,504, a decrease of £47,143 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended April 29 give total receipts of £358,127, or £19,333 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £183 16s. 10d. per mile of single track, and last year at the rate of £193 15s. 4d., thus showing a decrease for the week of £9 18s. 6d. per mile open.

Cork Electric Tramways and Lighting Co., Ltd.—The report for the year 1921 shows that the revenue amounted to £114,772 and the expenses to £98,771, leaving a balance, including the amount brought forward, of £21,703. Deducting income tax £2,052, interest £4,851, and amount transferred for reserve for depreciation and renewals £12,000, there was a balance of £2,799 to be carried forward. In view of the heavy loss sustained by the company last year through the two months' strike of its employees, the subsequent coal strike, and the disturbed state of the country during the first half of the year, which severely affected business generally, the directors considered the results satisfactory. The capital expenditure during the year has been increased by £35,000, covering mainly the installation of a 2,000 kw. Curtis turbine and other plant at the Cork generating station.

English Electric Company, Ltd.—The report for the past year shows that the net profits, including amounts transferred from reserves previously set aside and no longer required total £317,423. The ordinary dividend is reduced from 8 per cent. to 5 per cent., less tax, and, after transferring £60,000 to reserve for contingencies, a balance of £55,599 is carried forward, against £46,236 brought in. The falling off in orders which was general in the steel and engineering trades in the earlier part of the year under review was accelerated by the prolonged coal strike, with the result that during the later months some of the company's works were not fully employed. But for this handicap the available profits would have been higher. In view of the heavy fall in the price of materials during the past year the directors have considered it advisable to write down the stocks of materials, etc., held by the English Electric Company and its subsidiaries, so as to reduce them to current market values or less, and this decision has been given effect to in the accounts under review. It is pointed out that the variations of the assets shown in the balance-sheet as compared with the figures of the

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previous year are chiefly the result of the progress which has been made towards completing the amalgamation of the company's subsidiaries, the Dick, Kerr Works at Preston having been transferred to the English Electric Company in April last year, and the Coventry Ordnance works having been leased as from January 1, 1921.

FOR SALE.

SHEFFIELD CORPORATION TRAMWAYS AND MOTORS.

For Sale.—One T.S.3, 40 h.-p. Tilling-Stevens Petrol Electric Chassis, complete with spares and tools. Chassis was purchased new in July, 1919, and is in good running order.

Further particulars may be obtained from the undersigned.

A. R. FEARNLEY,
General Manager.

Division Street, Sheffield.

BUILDINGS (Wood), 60 ft. by 15 ft., 30 ft. by 15 ft., 150 ft. by 30 ft., 75 ft. by 30 ft., and 55 ft. by 30 ft.; delivered on quay at Liverpool or Preston.—INSULAR TRADING CO., LTD., Douglas, I.O.M.

Wanted.—A few second hand Trolley Standards for double-deck open-top cars. Height approximately 4 ft. 3 ins.—Apply Box No. 27, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

TRAMWAY SUPPLIES, Ltd.
Tramway Engineers,
OVERHEAD LINE MATERIALS AND SUPPLIES.
Sole Manufacturers of
TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.
Telegrams: "Controller, Leeds." Telephone 68, Headingley.
GROVE MILLS, MEANWOOD, LEEDS.
London Office: 93, CANNON STREET, E.C.4.
Telephone: City 3014. Telegrams: "Tramsuplim, Cannon, London."

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	May 3	3,221	3,399	+ 178	48¾	169.074	— 14.198
" Motor Buses	" 3	177	266	+ 89	48¾	10.692	+ 8.846
Ayr Corporation ..	" 6	619	597	— 22	51	34,793	— 2,776
Barrow Corporation ..	" 6	899	586	— 313	5	3,068	— 1,289
Belfast City	" 5	13,687	12,251	— 1,436	5	60.755	— 4.226
Birkenhead Corporation	" 7	2,390	2,593	+ 203	5¾	13.397	— 320
" Motor Buses	" 7	609	656	+ 47	5¾	3.555	+ 557
Birmingham Corporat'n	April 29	31,642	28,227	— 3,415	4	118,176	— 15,074
" Motor Buses	" 29	2,189	1,692	— 497	4	7,260	— 1,534
Blackburn Corporation	May 3	1 732	2,262	+ 530	5¾	13,078	— 1,194
Bradford Corporation..	" 6	12,182	13,904	+ 1,722	6	72,718	— 1,791
Burnley Corporation ..	" 6	948	3.256	+ 2,308	..	..	..
Burton-on-Trent Corp.	" 7	644	571	— 73	5	2,894	— 365
Bury Corporation ..	" 7	2,228	2,478	+ 250	5¾	13,075	— 1,101
Chatham & District ..	April 27	1,642	1,538	— 104	17	25,108	— 2,646
Chesterfield Corporat'n.	May 1	1,362	1,218	— 144	4	5.721	— 491
Derby Corporation ..	" 6	1,919	2,047	+ 128	5	10,914	— 978
Dundee City ..	" 3	3,473	3,054	— 419	50¾	158,290	+ 2,031
East Ham Corporation	" 6	2,145	2,115	+ 30	5½	11,161	+ 320
Edinburgh Corp. Trys.	April 29	..	11,371	..	50	619,407	— 44,325
" Motor Buses	" 29	..	3,278	..	50	174.902	..
Glasgow Corporation ..	May 6	49,956	44,796	— 5,160	48½	2,185,777	— 23,327
Glossop (U.E. Sup. Co.)	" 6	269	231	— 38	18	4,116	— 193
Halifax Corporation ..	" 2	4.432	4,091	— 341	4½	19,516	— 614
" Motor Buses	" 2	104	57	— 47	4½	270	— 230
" Railless Cars	" 2	..	54	..	4½	264	...
Huddersfield Corporatn.	" 6	5.506	5,472	— 34	6	31,850	— 1,098
Ilford U.D. Council ..	" 6	1,541	1,556	+ 15	5½	7,808	+ 167
Ipswich Corporation ...	" 6	736	782	+ 46	5	4,133	— 101
Isle of Thanet ..	" 3	706	767	+ 61	30½	19,487	+ 821
Kilmarnock Corporat'n	" 6	387	351	— 36	50¾	17,857	— 951
Leicester Corporation..	" 6	5,629	7,552	+ 1,923	18	129.661	+ 14,106
Liverpool Corporation	" 6	24.845	29,445	+ 4,600	18	518,458	+ 18,412
London County Ccl. ..	" 10	102,288	97,969	— 4,329	5½	533,504	— 47,143
Maidstone Corporation	" 4	470	468	— 2	4½	2.592	— 108
Manchester Corp. ..	April 29	40,607	36,955	+ 3,652	4	154,120	— 4,596
Newcastle-on-T. Corp.	" 29	10,874	9,519	— 1,355	4	41,500	— 3,917
Nottingham Corp.	May 4	5.887	7.674	+ 1,787	5	37,435	+ 3,498
Oldham Corporation ...	" 7	4,354	4.662	+ 308	6	28,975	— 512
Preston Corporation ...	" 3	1,850	1,798	— 52	4½	8,519	— 568
" Motor Buses	" 3	..	132	..	4½	620	..
Reading Corporation ...	" 4	1,411	1,499	+ 88	5	7,467	— 70
" Motor Buses	" 4	334	324	— 10	5	1,623	+ 141
Rotherham Corporation	" 8	1,966	2,117	+ 151	5	10,841	+ 408
Salford Corporation ..	" 7	10.432	10.715	+ 283	5¾	54,604	— 3,088
Sheffield Corporation..	" 7	17,501	18,537	+ 1,036	5¾	95,709	— 3,707
Southampton Corp. ..	" 8	2,273	3,029	+ 756	5	14,097	+ 206
" Motor Buses	" 8	386	101	— 285	5	479	— 332
Southend-on-Sea Corp.	" 3	1,473	2,159	+ 686	5	10,754	+ 2,381
South Shields Corp. ..	" 6	1,405	1,592	+ 187	5	8,710	+ 959
St. Helens Corporation	" 2	1,812	1,520	— 292	5	7,236	— 821
Sunderland Corp. ..	" 7	2,001	2,399	+ 398	5	12,885	— 341
Swindon Corporation..	" 3	419	353	— 66	4½	1,663	— 201
Tyneside Trys., Trds...	April 26	1,087	749	— 338	17	13,750	— 6,372
Wallasey Corp. ..	May 6	2,584	2,553	— 31	5½	13,162	— 986
" Motor Buses	" 6	186	229	+ 43	5½	1,168	+ 91
Walsall Corporation ..	" 6	1,610	1,636	+ 26	5	8,695	— 92
" Motor Buses	" 6	862	888	+ 26	5	4,931	+ 156
Walthamstow U.D.C....	" 6	2,189	1,838	— 351	5½	9,625	— 899
Warrington Corp. ..	" 4	1,066	980	— 86	5	4,954	— 242
West Ham Corp. ..	" 4	6,054	5,685	— 369	4¾	28,095	— 2,029
Wolverhampton Corp.	" 10	2,221	2,136	— 85	6	12,842	— 240
" Motor Buses	" 10	600	644	+ 44	6	3,868	+ 384

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1921.	1922.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..	May 6	£80,726	87,566	18	£1,508,745	+ 60,438
Ballarat & Ben. (4 wks.)	Feb. 26	4.701	4,797	48	55,454	+ 3,216
Brazilian Traction (Mlrs)	Mar.	13,102,000	15,238,000	13	44,743,000	+ 6,825,000
Brisbane	Mar.	46,300	51,300	13	143,890	+ 8,105
British Columbia $	Mar.	867,083	849.680	39	7,771,665	+ 140,144
Buenos Aires Lacroze ..	April	60,238	57,619	44	579,438	+ 8,486
Burmah Tr. & Lght. Rs.	Mar.	50,931	60,926	34	463,423	+ 55,324
Calcutta .. Rs.	May 6	86,478	106,407	18	1,911,228	+ 665,476
Cape Town	Mar.	..	29,930	..	..	..
Carthagena & Herrerias	April	2,329	2,991	17	10,984	— 287
Cordoba	Mar.	21,717	25,382	52	277,368	+ 39,922
East India	April	4,560	4,065	39	37,082	— 905
Kalgoorlie ..	Feb.	* 316	2,031	8	4,211	+ 1,747
La Plata ..	Mar.	* 3,403	7,067	13	20.109	+ 9,471
Madras (2 weeks) Rs.	April 30	49,668	48,502	17	396.179	+ 151,299
Manila .. .. $	Mar.	298,317	284.576	13	903.829	— 22,255
Montevideo	April	46,189	47,960	26	279,419	— 7,458
Para	Mar.	22,189	22,238	17	89,446	— 1,772
Pernambuco	May 7	3,593	3,358	18½	65,538	— 14,790
Port Elizabeth	Mar.	..	7.851	..	..	..
Rangoon .. Rs.	Mar.	158,121	150,500	13	418,933	+ 17,536
Shanghai .. $	Jan.	155,705	180.635	4	180.635	+ 24,930
Singapore .. $	April 1	13,268	13,300	13	192,337	+ 36,087
Winnipeg .. $	Mar.	495,208	464,900	13	1,436,334	— 25,228

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

COMMON FUND COMPANIES.		
Metropolitan District Rly. Co. ..	Week ending May 6, 1922 ..	£234.626
London Electric Rly. Co.	Corresponding week last year ..	243.047
City & South London Rly. Co. ..	Decrease	8,421
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	3,881,534
London General Omnibus Co., Ltd.	Corresponding period last year ..	4,151,468
	Decrease	269,934
LONDON & SUBURBAN TRACTION GROUP	Week ending May 6, 1922 ..	£50,437
Metropolitan Elec. Tramways, Ltd.	Corresponding week last year ..	55,524
London United Tramways, Ltd.	Decrease	5,087
South Met. Elec. Tr. & Ltg. Co., Ltd.	Aggregate from Jan. 1 to date ..	830,853
Tramways (M.E.T.) Omnibus Co., Ltd	Corresponding period last year ..	922,285
Gearless Motor Omnibus Co., Ltd.	Decrease	91,432

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending May 6, 1922 ...	£32.743	£3,751	£36,494
Total Receipts (18 weeks) ...	591,895	67,627	659,522
MERSEY RAILWAY			
Week ending May 6, 1922 ...	—	—	£5,040
Total Receipts (18 weeks) ...	—	—	84,182

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, MAY 18, 1922. VOL. LI.

LIVERPOOL CORPORATION TRAMWAYS.

THE NEW LAYOUT AT THE PIERHEAD TERMINUS.

The layout of the new Pierhead terminus of Liverpool Corporation Tramways affords a peculiarly successful solution of the traffic problem at this important and busy centre of the city's chief transport undertaking. In a town situated as is Liverpool in relation to the Mersey, it will be readily appreciated that the waterside forms one of the key points of the tramway system. A large proportion of the business population either live across the river in Cheshire or have frequent occasion to cross the waterway in the course of their work. The Liverpool tramway system therefore takes the form to some degree of an open fan, with the Pierhead as the centre, the majority of the routes radiating to the various suburbs. There are, however, several intersecting routes cutting across and linking up these radial lines. The effect of this configuration would be, in the absence of some carefully devised scheme, to create at the Pierhead a most undesirable congestion, as the amount of loading and unloading, especially at rush hours, is considerable.

By the courtesy of Mr. J. A. Brodie, M.Eng., P.P.Inst.C.E., the city engineer, we are able to reproduce photographs showing the layout of the new Pierhead terminus. It rarely happens that a tramway authority has an opportunity entirely to re-plan and extend its central terminus, and the committee, the city engineer, and the general manager (Mr. P. Priestly, M.I.E.E.) of the Liverpool Corporation Tramways are to be congratulated upon having taken the fullest advantage of the facilities afforded by the reconstruction works which have followed the abolition of certain obsolete docks. In the details of the layout shown in Fig. 1, the bold and original treatment which one is accustomed to associate with Mr. Brodie's designs is apparent. The layout consists of three large "balloon" loops with extensive standby accommodation, and represents the solution reached after prolonged consideration of the tramway traffic problem at the Pierhead. The three loops divide the traffic as it arrives from the outlying districts, and the two parallel lengths of track running the full length of the Pierhead frontage provide a loading space in excess of the present requirements. The loops are so connected that in the event of a breakdown on any one of them the traffic can immediately be diverted to the others. All the cars are thus enabled to return

The New Pierhead Terminus of Liverpool Corporation Tramways—View Looking towards the Mersey.

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by the route on which they arrived. For example, cars arriving at the Pierhead by Water Street can traverse Loop No. 2 and set out on the outward journey along the same street. The advantage of the three loops becomes clear when it is recollected that on the old layout the majority of the cars used one central loop, with its very limited loading frontage, and that the normal traffic at this terminus is approximately 3,000 cars per day. The new terminus was put into service in March 1921, and the accompanying illustrations show the lay-out. Two of the photographs were taken from the top of the Cunard building.

At present the traffic arrangements for the loops are as follows—

No. 1.—Smithdown Road, Wavertree, Calderstones, and Garston cars.

No. 2.—Prescot, Old Swan, Knotty Ash, West Derby, Green Lane, Edge Lane and Bowring Park cars.

No. 3.—Walton, Aintree, Fazakerley, Everton, Litherland, Seaforth, Cabbage Hall, Clubmoor and Croxteth cars.

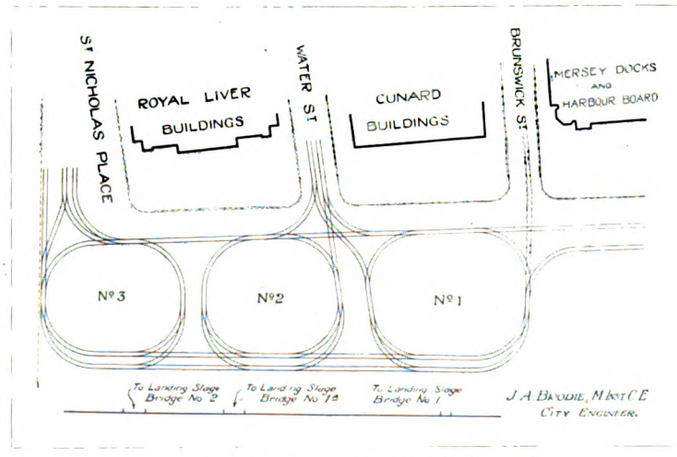
Each loop is provided with an illuminated destination indicator, which can be seen in the illustrations. Designs for shelters and queue arrangements are under consideration.

Manganese steel points have been used throughout the work, and the whole of the curved rails are of standard quality silicon steel, treated by the Sandberg "Insitu" rail hardening process. Before the application of the "Insitu" treatment the rate of wear on the curved rails (maximum radius 60 ft.) was very high, but we understand that this treatment has been successful in arresting the wear to such an extent that its cost has already been justified. At one time the entrance to Liverpool from the river was anything but pleasing; to-day, with the opening of new approaches to Chapel Street, Water Street and James Street, the erection of the imposing buildings of the Mersey Docks and Harbour Board, the Royal Liver Insurance Company and the Cunard Steamship Company, together with the arrangement of the tramway terminus around sunk gardens, the prospect is most attractive and dignified, and is certainly not excelled in any other commercial city either at home or abroad.

[Central Aerophoto Co.

THE LIVER BUILDING. CUNARD BUILDING. MERSEY HARBOUR BOARD BUILDING.

Liverpool Tramway Terminus at the Pierhead—View taken from an Aeroplane over the Mersey.



Plan of Tracks at Liverpool Pierhead.

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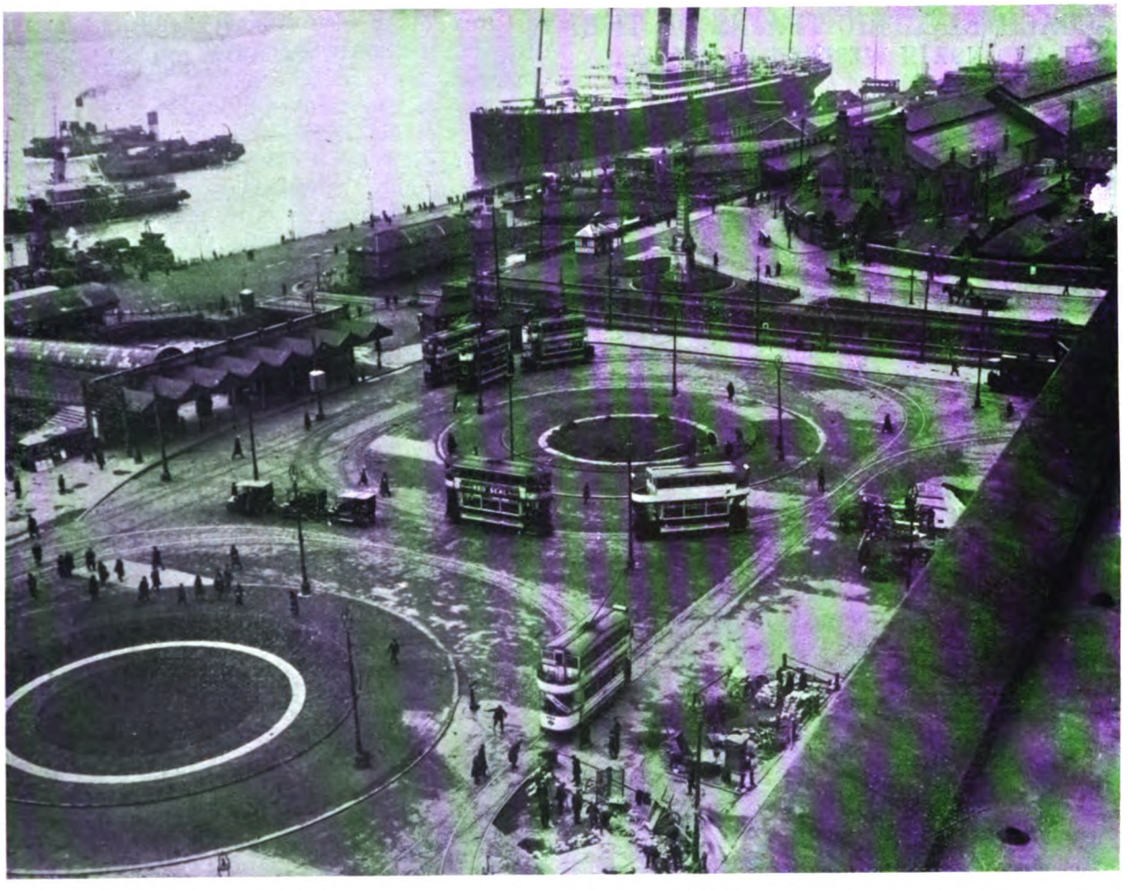
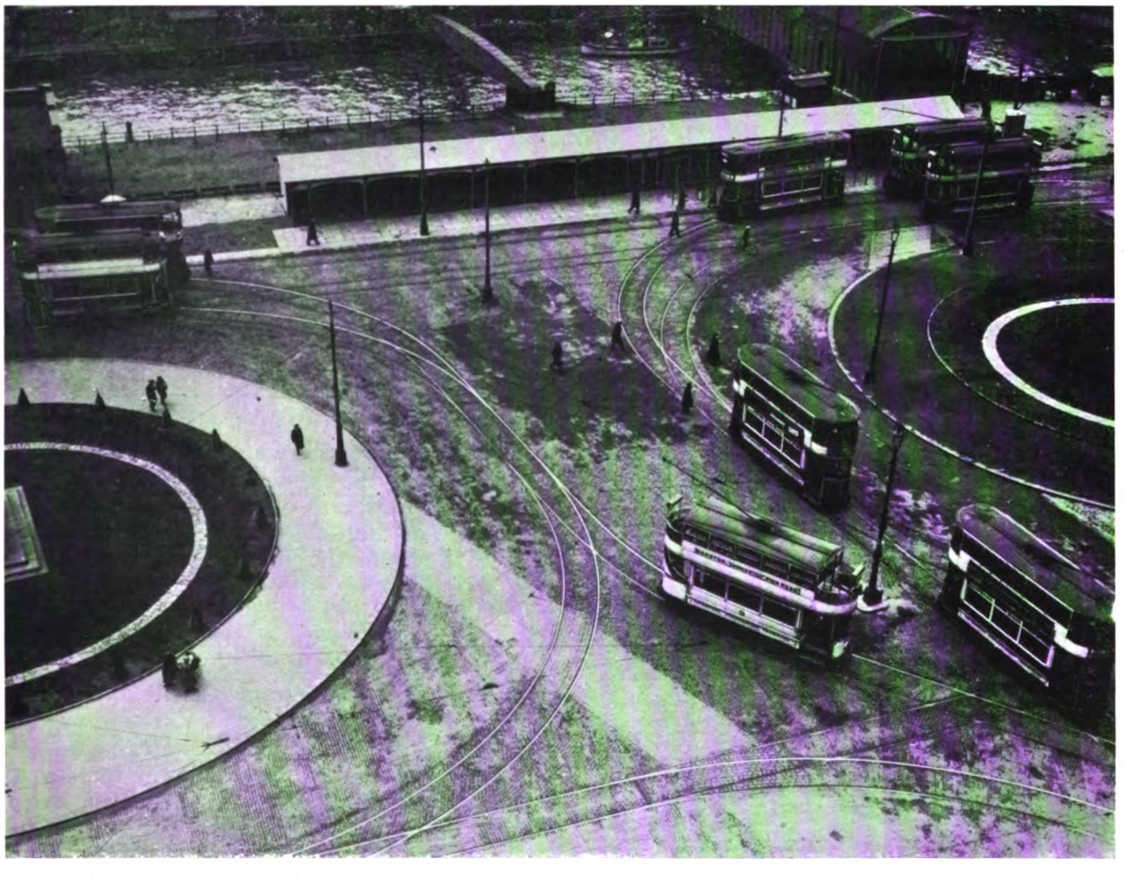


Loops Nos. 2 and 3—Liverpool Tramway Terminus at the Pierhead—View taken from the Cunard Building.



Arrangement of Tracks between Loops Nos. 2 and 3—Liverpool Tramway Terminus at the Pierhead.

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THREE-COACH ELECTRIC TRAINS OF THE LONDON AND NORTH WESTERN RAILWAY.

The extensive electrification work carried out in recent years by the London and North Western Railway Company on their suburban lines represents a very important advance in the gradual process of conversion to electric traction of the London suburban railway communications. The lines in question are operated with direct current at 630 volts, the current being collected from third and fourth rail. As traffic unit, a train composed of one motor coach, one trailer coach, and one driving trailer coach has been adopted; two of these traffic units can be coupled together, when required.

It is proposed, in this article, to describe these three-coach electric trains, which present several new and interesting features. The motor coaches for these trains are each equipped with four motors having each a one-hour rating of 250 H.P.; the motors are geared to the axles and suspended in the usual way with rubber compression pads between suspension lugs and the transom. A train speed of 44 miles per hour can be attained with drawbar pulls reaching 21,000 lbs. Multiple control is provided from any driver's cab.

In 1913 the London and North Western Railway Company placed its first contract for electrically operated three-coach trains for their suburban lines, Euston-Watford, Broad Street-Watford, Broad Street-Kew Bridge, and Broad Street-Richmond. Underframes, bogies and coach bodies for the 43 motor coaches under this contract were manufactured by the Metropolitan Carriage, Wagon and Finance Company, Limited, Saltley, Birmingham, while those of the 38 trailers and 38 driving trailers for coupling to them were constructed at the carriage works of the London and North Western Railway at Wolverton.

The electrical equipments for these coaches were ordered from the Oerlikon Company, of Oerlikon, Switzerland, through the representative of the firm, Mr. G. Wüthrich, M.I.E.E., now general manager and chief engineer of Messrs. Oerlikon, Limited, of 34-35 Norfolk Street, London, W.C2. An additional order was placed with them in 1915 for the electrical equipments of a further 30 three-coach trains and three spare motor coaches. These two contracts, covering in all 76 motor coaches, 68 trailers, and 68 driving trailers, were executed under very difficult conditions, as manufacture and erection were carried out, to a great extent, during the war.

Owing to the many conditions imposed by heavy suburban traffic, it was necessary to go into the whole question of electrical equipment very thoroughly. In the case of motor as well as of apparatus, special design was adopted, which, in many ways, departed considerably from standard practice; all these modifications proved, however, entirely satisfactory. It may also be added that the Oerlikon Company evolved a new system of multiple control for these coaches.

The first train units under the original contract were already in service in 1915, and gave excellent results. Owing to the exigencies of the war, the manufacture of the underframes, bogies, etc., and the coach bodies under the second contract had to be suspended until the end of the war. The material under this contract has now been delivered and stored at Saltley and Wolverton, and the equipments are in course of erection.

A brief summary of the very exhaustive and complete specification issued by Lieut.-Colonel F. A. Cortez-Leigh, T.D., R.E., chief electrical engineer of the London and North Western Railway is given below.

Three-Coach Electric Train, 1000 h.p., of London and North Western Railway with Oerlikon Equipment.

Specification of Trains and Main Data.

The traffic unit is a three-coach train, consisting of a motor coach with apparatus compartment and driver's cab, a trailer coach without driver's cab, and a driving trailer coach with driver's cab. These must be so arranged that two such three-coach trains can be coupled together and operated by means of multiple control. The multiple control is to be non-automatic as well as automatic, i.e., the driver is to be able, at will, to operate the controller for all the starting notches or to put the control handle immediately on to the requisite running position; the whole starting process is, in the latter case, to be governed by a relay, which operates when the motor current drops to a predetermined value after each successive current rush, and thus controls the automatic notching up. Furthermore, the electrical equipment of the three-coach train is to be arranged in two completely independent halves, so that one or the other half can easily be cut out when desired. Each motor coach is provided with four motors, two motors being mounted on each bogie.

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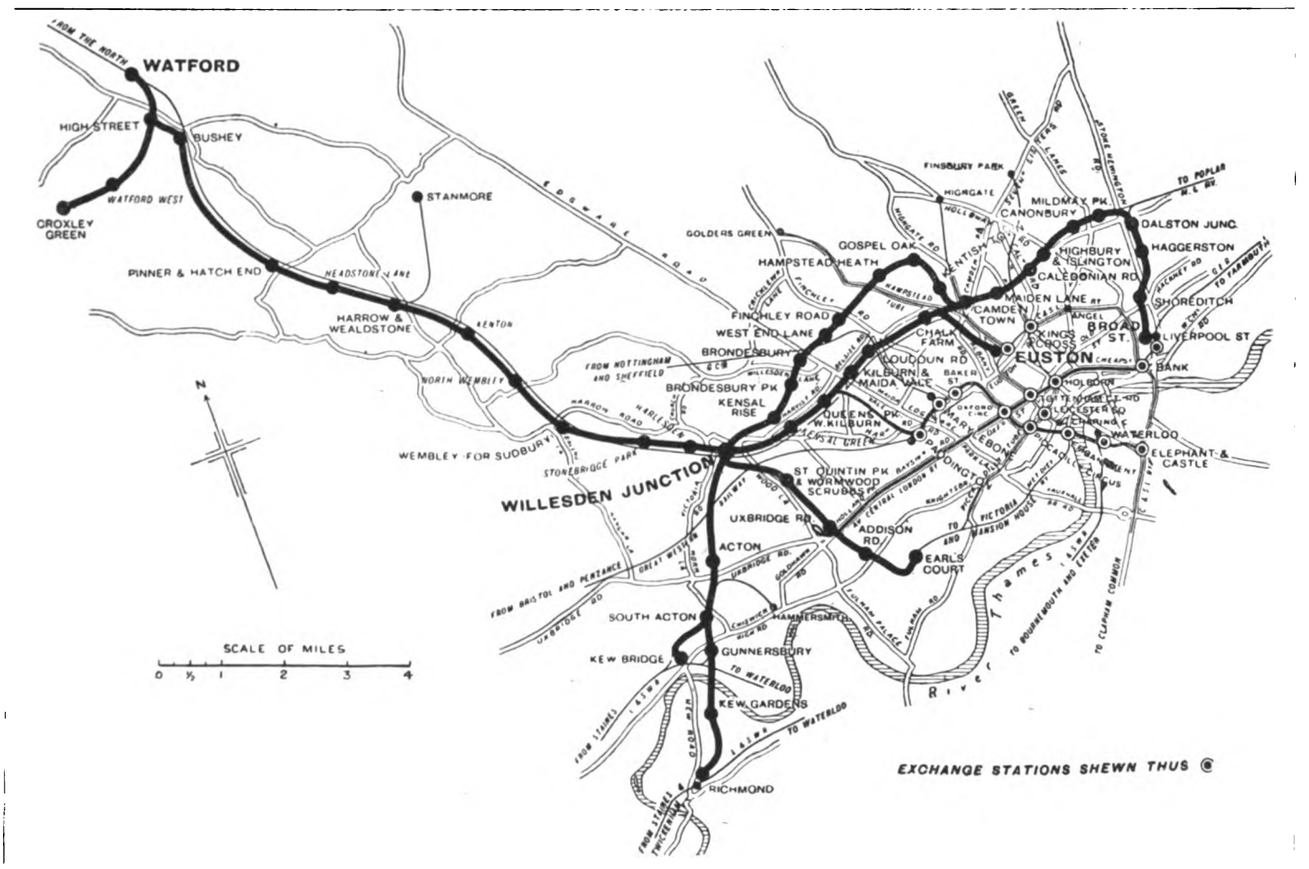
First-class Compartment in Trailer Coach.

Average running speed	25 miles per hour.
Maximum running speed, about	40 miles per hour.
One hour rating measured at wheel rim ...	1,000 H.P.
Drawbar pull measured at wheel rim ...	14,000 lb.
Maximum drawbar pull	21,000 lb.
Average acceleration when starting ...	1·2 miles per hour per sec.
Average pressure	575 volts.
Gauge	4 ft. 8½ in.
Diameter of driving wheel	3 ft. 7⅝ in.
Weight of three-coach train (empty) ...	112 tons.
Mechanical part	92 tons.

Electrical equipment consisting of—

Motors.	Switchboard.
Contactors.	Contact shoes.
Circuit breakers.	Controllers.
Reversers.	Main fuses.
Starting resistances.	Lighting and heating equipments.
Couplers and sockets.	Cables, conduit, and various erection material.
Relays.	

Approximately ... ... 19·7 tons.



Map of Electrified System of L. & N. W. Railway in London and Suburbs.

To determine the capacity of motors, calculations were based upon the profile of the various lines to be electrified and the speed diagrams for the different gradients. The estimated weight of each train was 112 tons, including 12 tons for passenger load and 16 tons for electrical equipment. It was, however, necessary when fixing capacity of motors to take into account the fact that the weight of electrical equipment might exceed the value assumed. After completion it was found that the weight of train and equipment, exclusive of passengers, amounted to 112 tons.

The figure obtained from calculations for one hour rating of motors was 225 H.P. measured at wheel rim. The motors supplied are, however, capable of developing 250 H.P. at wheel rim, on one hour service.

The principal data of the complete three-coach trains are as follows—

Third-class Compartment in Driving Trailer Coach.

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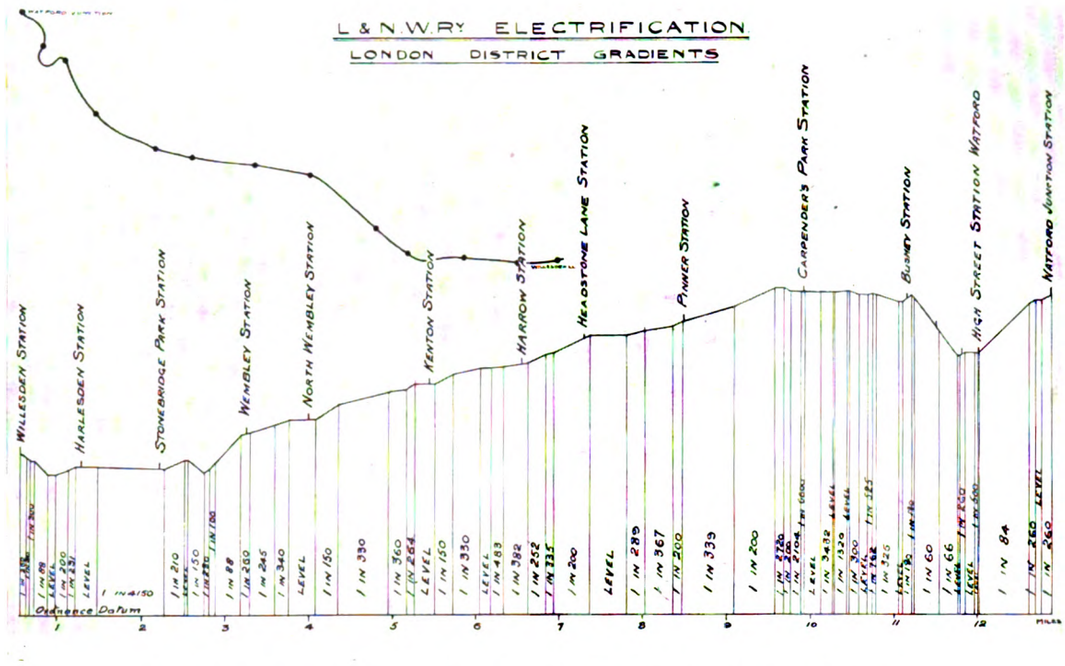


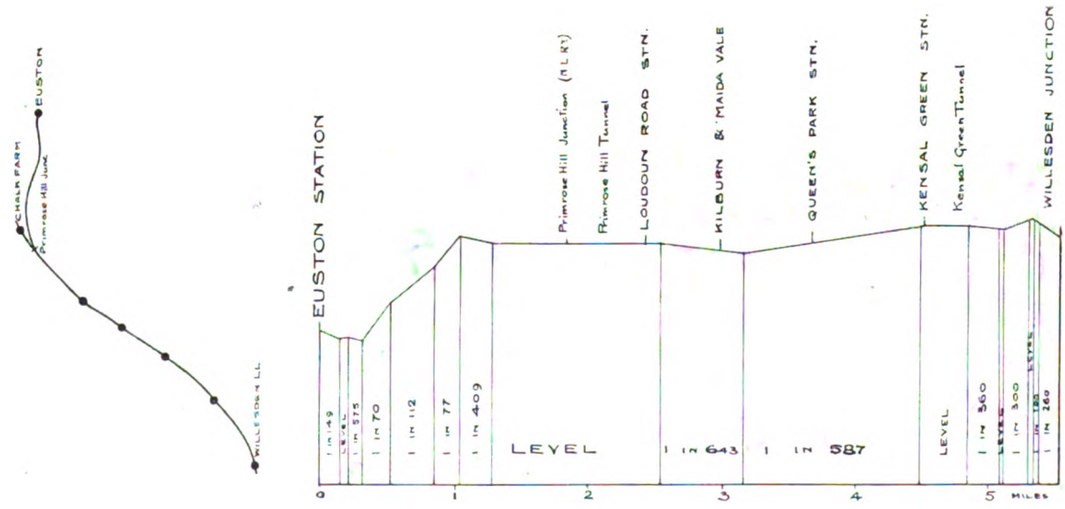
Profile of Section Willesden Station—Watford Junction Station, with Plan.

COACH DESIGN AND MECHANICAL PARTS.

The motor coach is provided with two two-axle bogies and a driver's cab at one end only; adjoining the latter is the apparatus cabin, the sides of which are provided with louvres for ventilation purposes. A small luggage compartment is arranged between the passenger compartment and the apparatus cabin, doors being provided to enable the train staff to pass through the train. The trailer, without driver's cab, is also mounted on two two-axle bogies and has one third-class and two first-class compartments; the interior of the coaches is carefully finished off, and the dimensions are ample. The driving trailer, with driver's cab, is at the end of the three-coach train; it is carried, as in the case of the other coaches, by two two-axle bogies. This coach is wholly reserved for third-class passengers, and constitutes one large compartment.

The seating accommodation in all compartments of the three-coach train is arranged both lengthways and transversely. All coaches are fitted with standard Westinghouse air brakes, motor coaches and driving trailers being provided with hand brake as well.

The lighting and heating of the coaches is electric throughout, and current for these purposes is taken and mainly controlled from the motor coach. Small marble switch panels are fitted in each car vestibule, whereby any series of five lamps or set of heaters can be turned on or off. Two single-pole switches are fitted in the luggage compartment of the motor coach, each controlling half the lighting and heating of the three-coach train, so that the guard can turn on or off the whole train lighting from one position, provided the local switches mentioned above are on. A single-pole switch is also fitted in the vestibule of each driving-trailer coach, so that the guard can control half the lighting from that end of the train when necessary.



Plan of Section Euston Station —Willesden Junction.

Profile of Section Euston Station—Willesden Junction.

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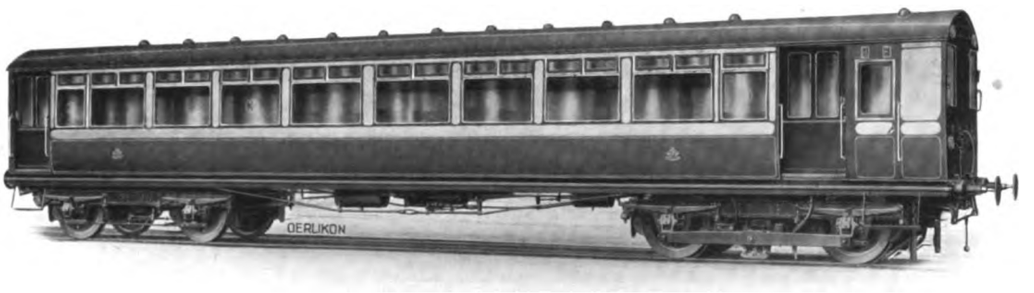
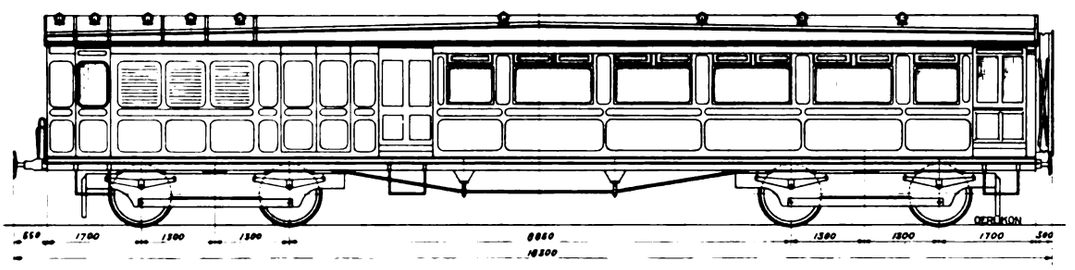
As previously mentioned, two three-coach trains can be coupled together so as to form one train and controlled jointly from one driver's cab, if traffic requirements necessitate this. When this train composition is adopted, the motor coaches are usually coupled at the extreme ends of the train.



Driving Trailer with Driver's Cab.

ELECTRICAL EQUIPMENT AND COLLECTING GEAR.

The whole electrical apparatus is fitted on motor coach. The diagram of connections given here refers to motor coach equipment only; furthermore, lighting, heating, and air compressor are not shown on it. The middle coach, or trailer, merely carries the busline cables for the main current, the control leads and the cables for compressor, lighting and heating; all these connections are run through the underframe of the coach. The motor and the driving trailer coaches at the ends of the train are fitted with complete control equipments. The third and fourth rail system has been adopted for collecting the current. The negative contact rail is arranged in the centre between the running rails, and the positive contact rail is placed outside the track with its centre 16 inches from gauge line; the current is collected from positive rail by means of sliding contact shoes, pressed down on rail by their own weight and suspended from cast-steel brackets; these brackets are bolted to oak shoe beams, carried on the axle boxes of the bogies. The contact shoes on the driving trailers are suspended from brackets in a similar way; these brackets are also supported by oak shoe beams. The negative shoe on the motor coaches is carried by a short oak beam fixed to a bracket attached to the motor casing. Both bogies on the motor coach, as well as the end bogie of the driving trailer (immediately beneath the driver's cab) are fitted with contact shoes. All contact shoes are connected to the main busline cables, and are individually protected by contact shoe fuses. The main cables are connected to the main knife switch on the switchboard in the driver's cab, so that the whole electrical equipment can be isolated by means of this main switch.



Outline Drawing of Motor Coach.

Motor Coach of Three-coach Train with One Hour Rating of 1000 h.p.

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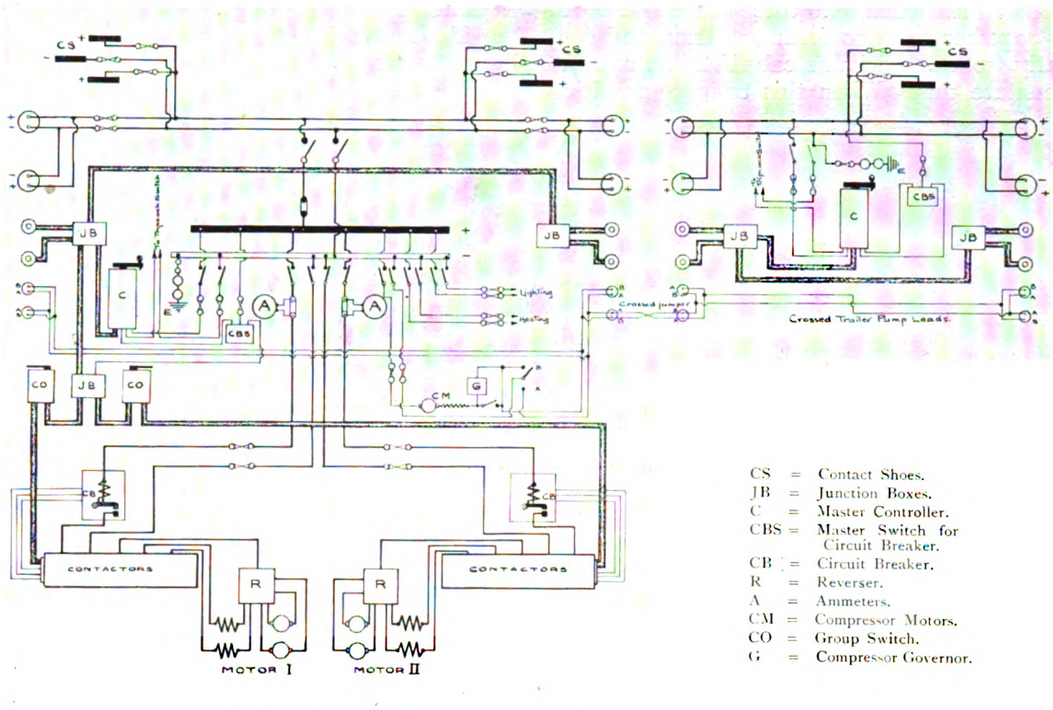


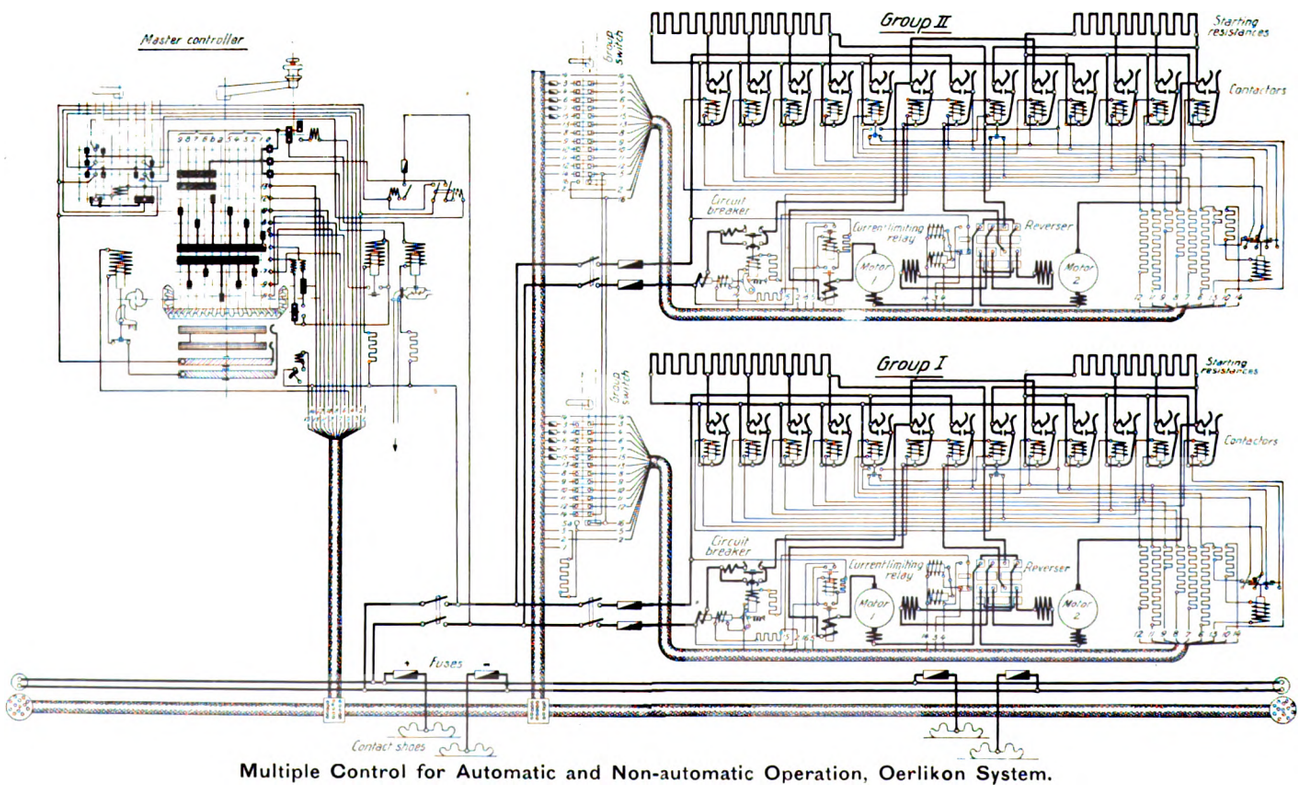
Simplified Diagram of Connections.

From the main switch the current is led to the two switches of the two groups of equipments. The control leads of the two groups pass through a multiple group switch; with this arrangement any control circuit can be cut off at will.

Traction Motors.

The motors have, as already stated, an hourly rating of 250 B.H.P. measured at the wheel rim. All motors were tested on the test bed of the Oerlikon Company, either by the London and North Western Railway Company's representative or by an expert nominated by them; the following trials were carried out—

(1) Measurement of temperature rise during and after one hour's run.
(2) Overspeed test at motor speed corresponding to train speed of 56 miles per hour.
(3) Checking of the characteristics by running the machine in both directions.
(4) Insulation tests with 2,000 volts A.C. hot.
(5) General insulation tests.



Multiple Control for Automatic and Non-automatic Operation, Oerlikon System.

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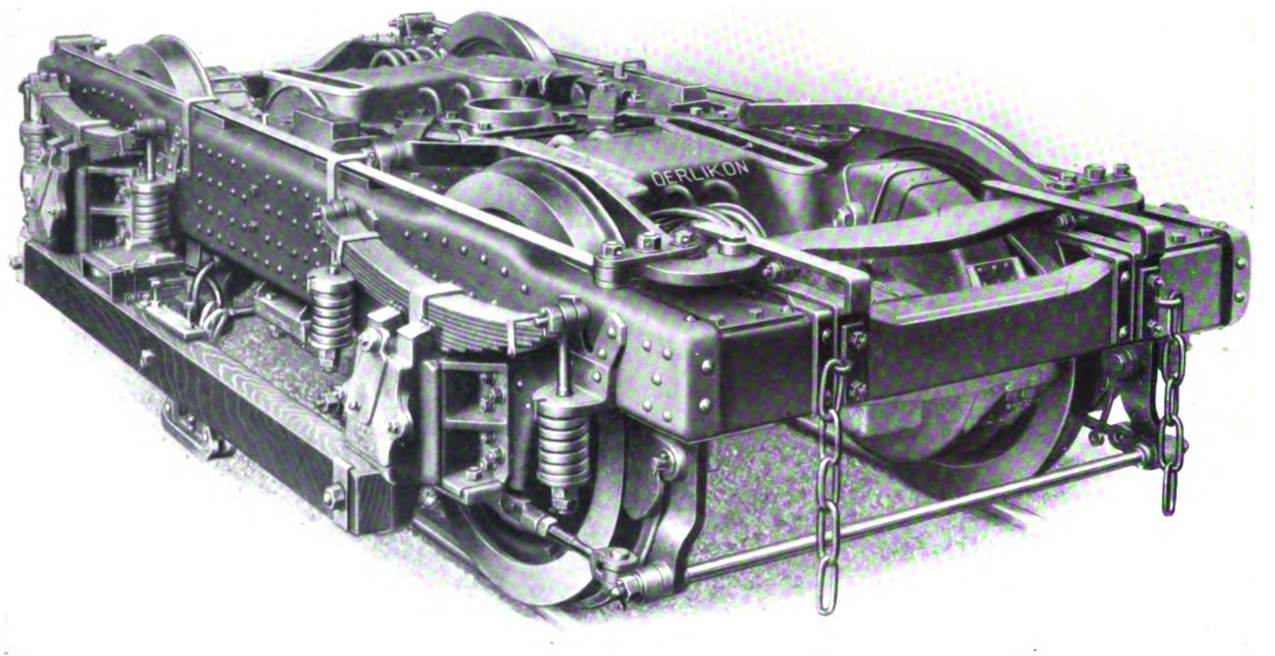
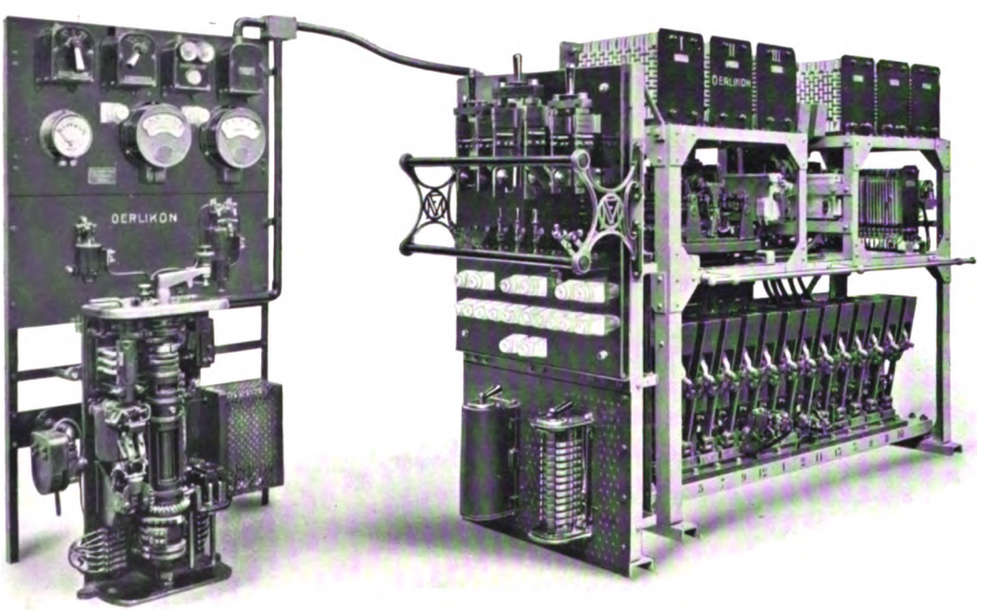
Motors picked out at random were subjected to efficiency trials, and to a load test with 140 B.H.P. and 400 volts.

The motors are totally enclosed and self-ventilated by means of fan bolted to commutator end-plate. The cooling air for the motors may be taken by means of flexible pipe connection from a duct communicating with exterior at a point of underframe where the air is comparatively pure and free from track or brake dust. At present, however, the intake openings are blanked off as the motors are so amply dimensioned that they do not exceed the guaranteed temperature rise in service. The motors are supported on one side by bearings on driving axles; on the other side the motors are fitted with noses held between compressed rubber blocks attached to the transom. The gearing has a ratio of 1 to 3·3. Both gear wheel and pinion are made of tempered tool steel; the gear wheel is in one piece and pressed on to the axle. The gearing is running very quietly and giving entire satisfaction.



Bogie of Motor Coach with Motors in Position.

The motors when developing 250 B.H.P.—their one-hour rating—and with a supply pressure of 575 volts, have a speed of 620 revolutions per minute, and an efficiency of 87 per cent., including losses in gearing. The maximum speed is 1,400 revolutions per minute. A special feature of the motors is the yoke carrying the brush holders, which is of cast steel; mica insulation is used throughout. The armature of motors is bar-wound



Control Equipment Erected in Test Room.

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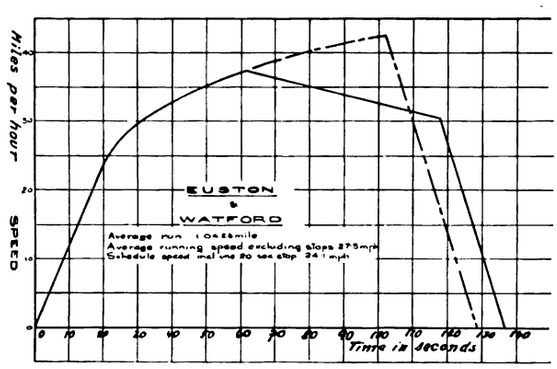
and the conductors are mica insulated in the slots. The field and auxiliary pole coils are built up of copper strip. Perfect commutation is obtained with these machines. It may be of interest to mention here that a motor of this type wound for a pressure of 2,400 volts has given, on test, 250 B.H.P. on one-hour service and developed continuously 150 B.H.P.; this machine has also dealt with the overloads stipulated without flashing over or sparking.



Starting Diagram (Euston and Watford).

The following are a few particulars regarding the motors for the London and North Western Railway equipments—

Diameter of armature	18·9 in.
Width of core	12·6 in.
Number of slots	53
Number of commutator segments ...	159
Diameter of commutator	16·9 in.
Number of brush holders	2
Number of brushes per holder ...	4
Weight without gearing	6,600 lb.

Control Gear.

For starting up and regulation, 13 contactors are provided for each two motor groups; these contactors are fitted with main and arcing contacts with magnetic blow-outs. They are electro-magnetically operated, very simple in design and very strong in construction; the wear of these contactors has proved to be very small. Built for 400 amps. at 360 to 630 volts, they are capable of breaking double their normal current without difficulty.

The circuit breakers have a double break and are provided with magnetic blow-out; they are operated electro-magnetically and are fitted with adjustable overload releases. Two main fuses are provided in addition to the circuit breakers for protecting the motors, each motor group having one circuit breaker and two fuses. If necessary the circuit breakers can also be operated by hand.

Each of the two groups is provided with an electrically operated reverser; the latter is interlocked with circuit breaker in such a way that the breaker of any group can only be closed when the corresponding reverser is in the position indicated by reversing key on the master controller. The starting resistances are built up of substantial cast-iron elements of special design; they are carried by mica insulated steel bolts, fitted in iron frames.

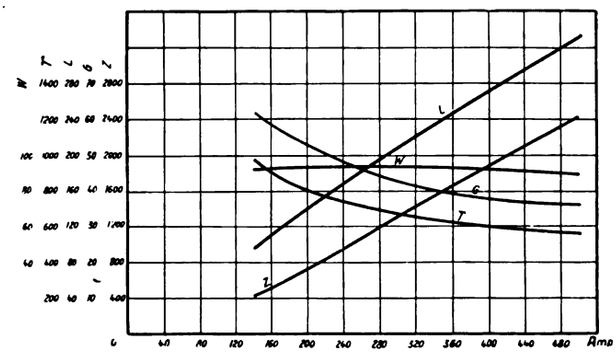
The motor and contact shoe fuses consist of copper strips which can easily be replaced; they are held in suitable clamps mounted in oak fuse boxes, the latter being lined with fire-proof material, and iron bound in such a manner as to secure a proper blow-out effect.

The controller is designed, as previously stated, for automatic as well as non-automatic operation. It is provided with a "dead man's" handle, so arranged that, during operation, the driver has to depress by hand a push button fitted in the controller handle. As soon as the push button is released, the control circuit of the contactors is broken and the brake relay actuates the air brake. Nine starting steps are provided, five for series connections and four for parallel connections of motors, the fifth and ninth steps respectively being running positions. The change-over from series to parallel connections of motors is effected, without break, by means of the bridging connections.

Automatic Operation.

During automatic operation of the motor-coaches, the controller spindle and drum move independently, the latter being actuated by a ratchet magnet; if the position of controller handle and drum coincide, the circuit of ratchet magnet is open; when, however, a relative angular displacement occurs, owing to the controller being moved to a given position, the circuit of ratchet magnet is closed and the ratchet gear causes stepwise motion of drum until the latter reaches position corresponding to that of controller handle. The opening and closing of ratchet magnet circuit is effected by means of two contact fingers which are fitted to carrier at lower end of controller spindle and slide on contact segments mounted on drum; connection between contact fingers and ratchet gear is ensured by two contact rings carried by controller spindle and contacts on stationary portion of controller. When the motor of controller handle is reversed, the drum is carried back with it by means of an interlocking notch.

A current limiting relay is inserted in the circuit of the ratchet apparatus so that forward motion of the controller drum is only possible when the motor current does not exceed a certain value, previously fixed. The driver can therefore set his controller handle immediately in the desired running position; the ratchet apparatus will then cause the drum to



Characteristics of Motor.

W = Efficiency per cent.
G = Speed k.m. per hour.
L = Output in horse power.
Z = Tractive effort in k.g.
T = Revolutions per minute.
Tractive effort and output are measured at wheel rim.

revolve, the speed being regulated by the current-limiting relay.

The controller drum is provided with the necessary contact segments for bringing into play the number of contactors corresponding to each speed step. When the

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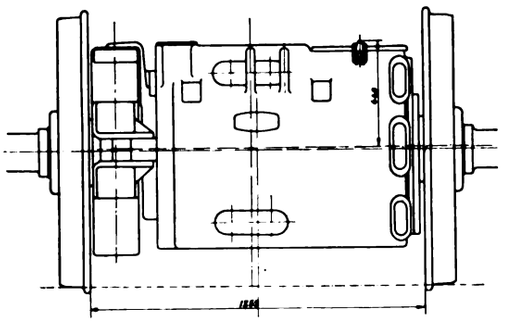
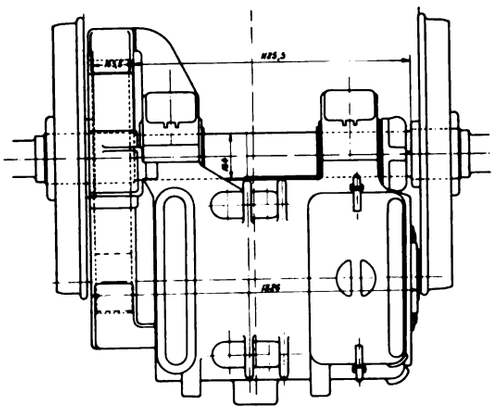
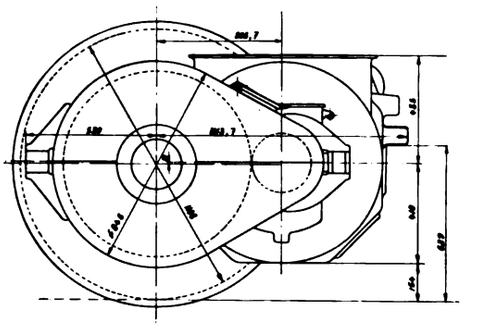
controller is not required to operate automatically, the controller drum is coupled to the controller handle by means of a simple clutch actuated by a knob on the top plate of controller; the latter operates then as an ordinary controller; the automatic gear is, in this case, cut out and does not interfere in any way with the non-





automatic operation of controller. Electrical interlocking contacts are fitted on two contactors only; there are, in addition to these, mechanical interlocks on three of the most important contactors. This interlocking gear ensures very effectively the correct operation of the contactors under all conditions of service and removes the possibility of short-circuits or current rushes occurring owing to the contactors "sticking in." The arrangement adopted permits of a considerable reduction in the number of electrical connections and has been found to satisfy entirely the conditions specified. This simple design of contactor gear has proved wholly successful, and given excellent results during the many years it has now been in use.

The operating coils of contactors are in series for any position of controller. In order to keep the value of



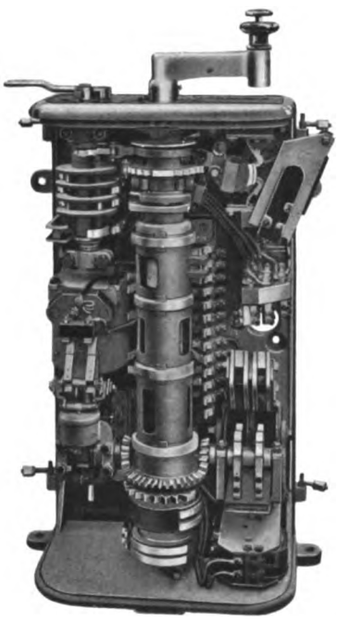
Outline of Oerlikon Motor with Gearing.

resistance constant for every controller position, the operating coils cut out are replaced by resistances in series. The control circuit of contactors is arranged so that no interruption of current takes place when passing from one position to the next. Furthermore, no arcing can occur between the fingers and the contact segments of controller, as the circuit is broken in a central blow-out; in view of this the wear of fingers and contact segments is very slight, even after several years' service. The central blow-out gear is operated by the controller drum through bevel gear, and the current is interrupted in a powerful magnetic field.

For changing over from series to parallel connection, a relay is provided which permits of the utilisation of the same control leads for both control positions; in this way four control wires can be dispensed with.

Contactor, 400 amps., 630 volts, with upturned arc chute.

Main Circuit Breaker, 800 amps., 630 volts, with upturned arc chute.



Master Controller for Automatic and Non-automatic Multiple Control.

All cables are placed in seamless steel tubes, and joints are made in cast-iron junction boxes, except in the case where the wires are connected to apparatus.

The weight of the electrical equipment which, as stated before, amounts to about 20 tons, is made up as follows—

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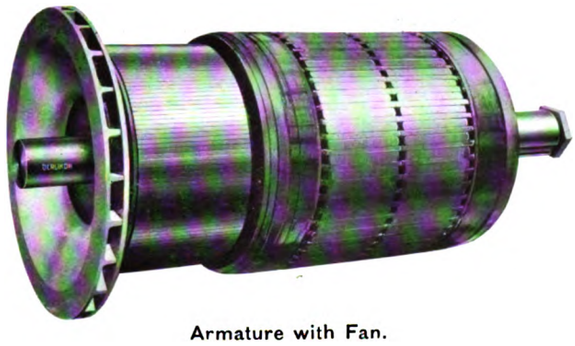
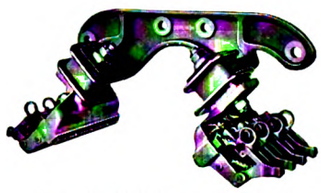
Detailed Weights of Electrical Equipment.

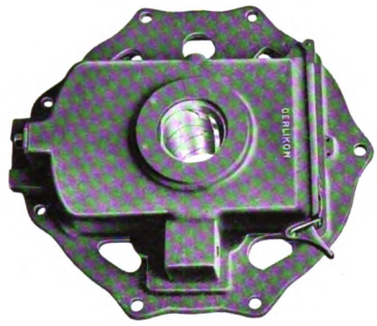
4	Motors, including gearing	28,600 lb.
26	Contactors	3,300 ,,
2	Circuit breakers	374 ,,
40	Couplers for busline and control leads, also for compressor and lighting connections ...	1,100 ,,
6	Relays (2 series-parallel, 2 brake, 2 no-volt)	132 ,,
3	Switchboards	440 ,,
2	Reversers	550 ,,
9	Sets of contact shoe collecting gear ...	1,320 ,,
2	Controllers	880 ,,
13	Main fuses	660 ,,
2	Group switches	88 ,,
2	Current limiting relays	44 ,,
2	Sets of starting and regulating resistances ...	1,980 ,,
2	Sets of control resistances	154 ,,
4	Control and heating switches	44 ,,
	Lighting and erection material	4,334 ,,
		44,000 ,,



Armature with Fan.



Brush Holders with End Bearing Shield.



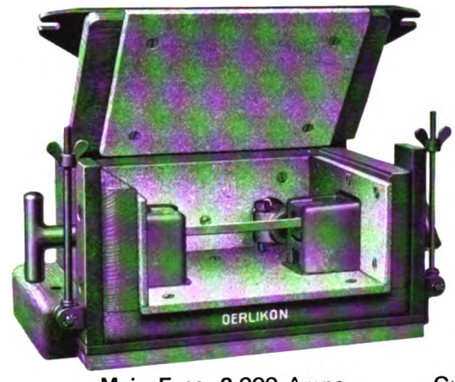
Performance at Tests.

All train units have been tested on the Willesden-Watford line, or on other sections of the system. Average figures, taken from the acceptance certificates of the train units 30 E to 47 E, for about twenty trial runs, including starts, are given below; the length of run was 12·252 miles with eleven stops of 20 seconds each. The average distance between stops was 1·114 miles.

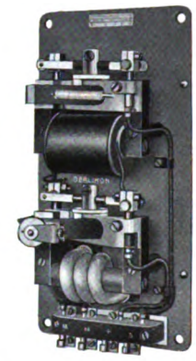
Guaranteed figures, as well as average values based upon the figures in the above table are given below in order to permit of comparison.

	Average values obtained at tests	Guarantee figures
Starting acceleration	1·4 miles per hour/sec. 0·63 metres/sec².	1·2 miles per hour/sec. 0·535 metres/sec².
Energy consumption	64·9 watt-hours per ton-miles	66 watt-hours per ton-miles
Maximum motor current when starting	417 amps.	500 amps.

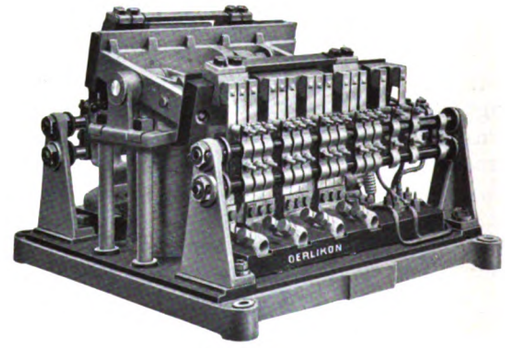
Owing to the good acceleration obtained, the condition stipulating that a speed of 24 miles per hour was



Main Fuse, 2,000 Amps., 630 Volts.



Current Limiting Relay with Cover Removed.



Reverser.

to be reached, when starting, within 20 seconds, could be easily satisfied.

The temperature rise of the motors and starting resistances, in continuous service, proved also to be very low. After a 17 hours' normal service on the Earl's Court-Willesden line, the following maximum

No. Train		Train Composition	Starting Acceleration: Miles per hour per second	Starting Acceleration: Metres per sec.²	Starting Acceleration: Per ton-mile	Energy Consumption in watt-hours: Per ton kilometre	Maximum current per motor amps.
30 E	33 E	6 coach	1·44	0·63	66·8	42·3	400
	31 E	3 ,,	1·45	0·65	75·2	47·5	410
32 E	34 E	6 ,,	1·54	0·68	70·4	43·7	420
35 E	36 E	6 ,,	1·31	0·59	68·5	42·5	400
37 E	38 E	6 ,,	1·38	0·62	64·0	39·8	420
39 E	40 E	6 ,,	1·40	0·63	64·1	39·8	420
41 E	42 E	6 ,,	1·39	0·62	57·0	35·5	420
43 E	44 E	6 ,,	1·46	0·65	61·7	38·4	440
45 E	46 E	6 ,,	1·36	0·61	48·9	31·0	420
	47 E	3 ,,	1·40	0·63	68·1	42·5	420

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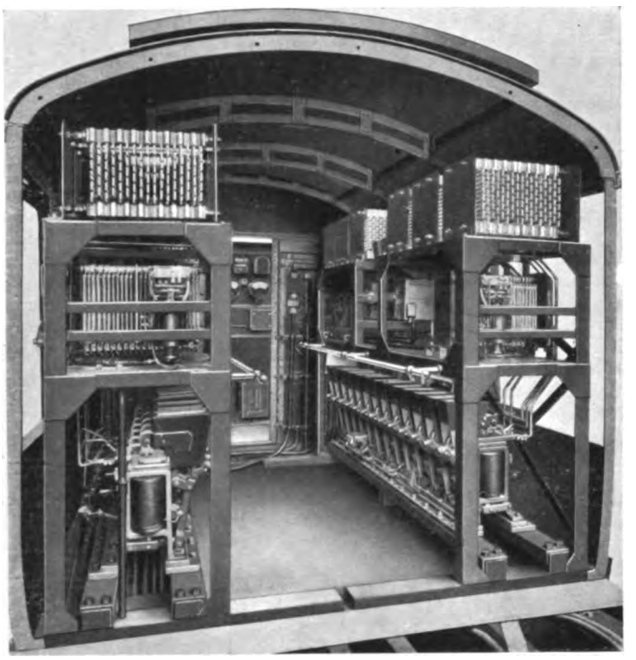
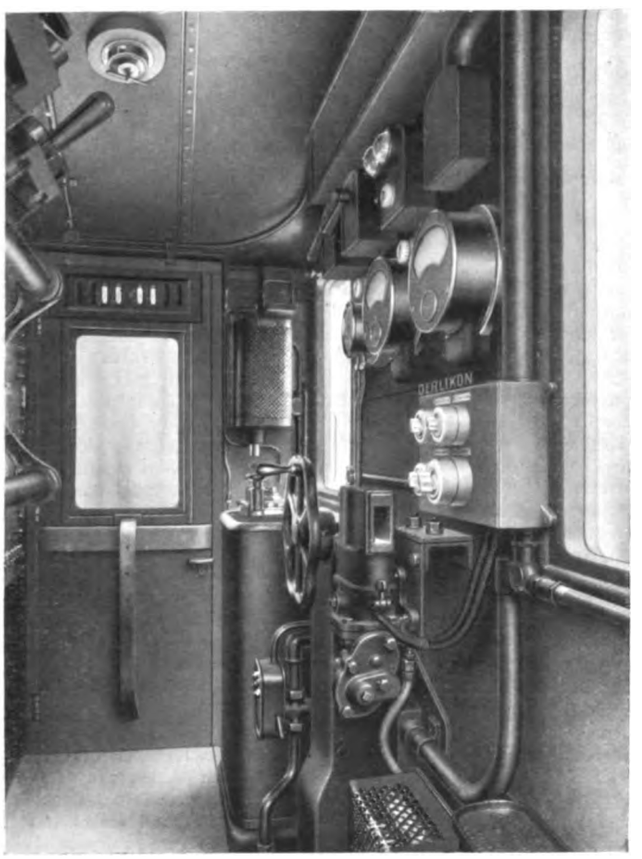
temperatures were measured with an atmospheric temperature of 24° C.—Commutator copper, 70° C.; armature core, 75° C.; starting resistances, 160° C. (cast iron).

In conclusion, it can be said that the excellent



View of Apparatus Cabin during Erection.



Driver's Cab in Motor Coach.

results obtained throughout the period of nearly six years during which the motor coaches have now been in service have fully demonstrated the soundness of the design and construction of the equipments.

RAILWAY ELECTRIFICATION AND SAFETY

LIMITS OF VOLTAGES NEAR THE GROUND.

In a recent lecture on "Electric Traction" at the London County Council's School of Engineering and Navigation, Mr. Theodore Stevens dealt with the risks involved in high voltages in conductors near the ground. He quoted the opinion of other American and of French engineers from reports submitted to the meeting of the International Railway Association held at Rome last month. The French decision was that 1,500 volts is the maximum permissible near the ground, and for higher volts overhead construction must be used.

Mr. George Gibbs' report at the same meeting was quoted as follows—

> "There are important objections to a third rail being used for general electrification."
>
> "Serious consequences increase rapidly as the voltage in third rail is raised."
>
> "Weighty objections to the use of 1,200 or 1,500 volts in third rail."
>
> "Impracticable to instal it within American railroad clearances properly insulated and protected in a manner which will adequately safeguard the public and employees."
>
> "The decision which has been arrived at in England (Ministry of Transport's Electrification of Railways Advisory Committee's Final Report 1921) to allow the installation of a 1,500 volt third rail is, presumably, for special cases only, and for operating conditions and clearances which do not exist in America."
>
> "Overhead conductor promises to become standard for heavy electric traction . . . provides continuous contact at the train over complicated track layouts."

The most economical overhead distribution to trains was shown, with acknowledgment to the British Aluminium Company for loan of lantern slides illustrating the Lake Erie and Northern Railway's long span catenary consisting of a steel core, for strength, and aluminium surround, for conductivity, thereby doing away with all expense for separate feeders.

The lecturer, having both American and British experience, stated that the small wheels on much American rolling stock necessitates a greater space between third rail and running gauge line than in England, but he knows of nothing to warrant 1,500 volts in a third rail near the ground either in England or America.

Danger of High Voltages at the Surface.

The more important consideration, in his opinion, was that to supply a third rail with 1,500 volts very seriously adds to the risk to lives of employees on permanent way work, and to any member of the public who accidentally gets on the line. Under such probabilities of death the higher voltages near the ground he declared are not justifiable, even if they were cheaper to instal or cheaper to operate, but he contended that they are not cheaper, and gave estimates in support of his belief, which are below set out.

In some London tubes for legal requirements a fourth rail is installed, but the electrical potential is comparatively near to that of the running rails, so that to touch *this* fourth rail involves small risk of electric shock, unless the person has an unusually weak heart. (The lecturer told of one instance when one of his employees got a shock from a sheet of iron lying on wet ground, which, on test, showed 20 volts to "earth.")

The lecturer anticipates that the Ministry will make rules that will prevent the use of a fourth rail at even —600 volts from the running rail in addition to +600 on third rail, because with third

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and fourth rails there is not room to carry on the work necessary on permanent way, and it could only be a menace to the lives of everyone who comes near.

Advisory Committee's Report.

Dealing with the Advisory Committee's report, he insisted that it is necessary to apply the tests of practicability and safety and economy to this committee's advice. He finds no evidence in their report that consideration was given to the necessity for protecting employees and public from unnecessary risks to life from 1,500 volt conductors near the ground; no evidence that those officials of the Ministry of Transport whose duties include caring for the safety of the public were called before this Advisory Committee in reference to third or fourth rails. They dealt with overhead conductors only as stated, page 5, line 55, of the report.

Nor does he find any evidence that the committee considered in detail what is involved in their statement that 1,500 volts, *or a multiple of* 1,500, should be permitted on a third rail (page 4, lines 26 and 29 of report).

A three-wire system used to exist in the two parallel tunnels of the City and South London Tubes, where each tunnel had a separate 500 volt system with a total of 1,000 volts. The two were separated by such a distance that no one could get a 1,000 volt electric shock.

It seems extraordinary that the committee agreed to a multiple of 1,500 volts on a third rail without even wisely limiting the multiple.

It is fortunate for the public that the Ministry, by publishing that report, did not sanction anything so liable to cause unnecessary deaths as is inseparable from a high voltage in a rail near the ground within easy reach of anyone. Even trespassers do not deserve sudden death as punishment for trespassing; and no one really acquainted with permanent way work will suggest that it is practicable to complete within the few hours when trains are not running all the work essential on permanent way.

On one third rail 600 volts is fairly safe, but the multiple of 1,500 volts filled the lecturer with alarm, and he asked, "How could that committee contemplate such a risk to life?" Did they consider it? Then why does not the report say they did?

The considered opinion of the Ministry's official, who is responsible for the safety of the public, is needed on this multiple of 1,500 volts, where anyone can easily get a fatal shock from third or fourth rail.

Comparative Costs of Use of Different Voltages.

Carefully prepared estimates for 600 volts and for a multiple of 1,500 volts, based on details of British suburban services, show that there is no advantage in cost, and that whatever is spent on rendering protection to life by guarding third, and/or fourth, rail from contact adds further to the disadvantage in capital cost and in maintenance cost of the higher voltage (as compared with 600 volts).

Having in Mr. George Gibbs' report to the International Railway Association (April 1922), *inter alia*, engineering details of the Long Island Railway, "an example of electrification of a compact network of lines none of which extend more than 30 miles; therefore current distribution can be made economically by a low voltage system."

Closely resembling the basis used for the above British estimates, a practical interest was added by giving the essential basic values comparatively, as follows

	Existing Long Island Railway.	Basis of Estimates below.
Route miles	90	100
Single track miles	227	200 plus sidings
Lines extend from terminus ...	30	18 miles
Motor cars	494	33% less
Trail cars	140	15% more
Number of sub-stations	14	16
Sub-station plant	56,000 K.W.	55,000 K.W.
Miles between sub-stations ...	4·5	Same
Maximum trains per day ...	730	5% less
Maximum peak load	34,400 KW.	15% more
Rush hour load	—	27,500 KW.
Passengers, 1920	59,134,000	—
Train miles, 1920	3,769,000	50% more
Car-miles, 1920	20,400,000	40% more
Kelvins supplied, 1920	104,030,000	18% less
Ton miles, 1920	906,100,000	—
Maximum train	672 tons	45% lighter
Average speed	32 miles per hour	20% slower

1922 Comparative Estimates of Capital Costs of Electrifications of Suburban Railway (details above). Prices are given in £ per single track mile.

Voltage Collected.	600 volts.	Double 1,500 volts.
Power-house	£6,000	£6,000
Cables and sub-stations	5,000	2,500
Track work	3,000	7,500
Rolling stock and electrical equipment	15,000	16,000
	£29,000	£32,000

BUILDING EXHIBITION AT OLYMPIA.

Among the stands at the Building Exhibition, Olympia, which concluded on Thursday, April 27, were several containing material and products of interest to tramway managements and municipal authorities generally. The British Reinforced Concrete Engineering Company, of 1 Dickinson Street, Manchester, had specimens of their well-known fabric on view in various forms—B.R.C. columns, beams, and the familiar "slabs." Among the many excellent photographs of road reinforcement work in different parts of the country which were exhibited was one showing two adjoining sections of a tramway track laid in sets. While that section which had been laid on B.R.C. fabric appeared in excellent condition, the stretch not so supported had sunken badly. John Yates and Company, of Aston Manor, Birmingham, exhibited a large selection of tools, plant and stores for contractors, public authorities, tramway undertakings, etc. Among the items noted were rail carriages, jim crows, rail-carrying tongs, jacks, tie-bar spanners, post-hole borers, and a wide variety of shovels and picks. Millars' Timber and Trading Company, of Pinners' Hall, Great Winchester Street, E.C.2, being unable to secure a sufficiently large stand to do justice to their extensive range of labour-saving machinery for road and building construction, arranged a fine selection of photographs of typical machines. For visitors who desired to see a practical demonstration, the firm organised a service of cars to their works at Kirtling Street, Battersea, S.W. Ferodo Limited, of Chapel-en-le-Frith, had on view samples of their fibre stair treads, Feroleum floorings and nosings. What appeared to be a very useful attachment to tramcar running boards and stairs was a serrated metal edge, fitted in conjunction with Ferodo treads.

The Laffly (England) Company, of Lonsdale Road, West Kilburn, showed examples of the petrol engines taken from their road-sweeping, gully emptying, watering and other municipal machines. Building Products, Limited, of King's Road, S.W.3, were represented by a stand at which were demonstrated the insulating qualities of Cabot's quilt, which is being largely used in structures where it is desired to deaden noise or to keep an even temperature.

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TRANSPORT CONGRESS.

PROGRAMME OF IMPORTANT LONDON GATHERING.

Considerable interest is being taken in the Congress which is to be held in London from Wednesday, May 17, to Saturday, May 20, under the auspices of the Institute of Transport. Delegates are expected from the British Dominions, the United States of America, and the Continent. Papers will be read and discussed at meetings to be held on the mornings of the first three days at the Institution of Civil Engineers, Great George Street, Westminster, and a lecture to graduates and students will be delivered at the rooms of the Royal Society of Arts, John Street, Adelphi, W.C.2, at 5 p.m. on May 19. The afternoons of the three days and the Saturday following will be devoted to visits of inspection.

The Lord Mayor of London (Alderman Sir John J. Baddeley) has invited the delegates to a conversazione at the Mansion House on the evening of May 17, and the third dinner of the Institute will be held on the following evening. Subject to limitations of accommodation, each member attending the congress may invite one visitor to meetings and visits. Ladies accompanying the delegates and visitors may attend the Mansion House conversazione and the Institute dinner. The headquarters of the congress will be at the Hotel Metropole, Northumberland Avenue, London, W.C. Mr. H. E. Blain, C.B.E., honorary secretary of the Institute of Transport, has issued the programme of the Congress, which is as follows—

TUESDAY, MAY 16.

7 to 10 p.m.—Reception by the President (Sir Henry P. Maybury, K.C.M.G., C.B.), at the Hotel Metropole.

WEDNESDAY, MAY 17.

9.30 a.m.—The President will open the Congress.

10 a.m.—"Recent Improvements in transport facilities in the Port of London." By Sir Cyril Kirkpatrick.

11.15 a.m.—"Wireless as an aid to transport." By Captain M. P. H. Riall Sankey, C.B., C.B.E.

10 a.m.—"The design, construction and maintenance of highways in relation to the development of mechanically propelled vehicular traffic." By Col. C. H. Bressey O.B.E.

8 to 11 p.m.—The Lord Mayor of London will entertain the Congress at a conversazione at the Mansion House.

THURSDAY, MAY 18.

10 a.m.—"Inland water transport—a practical policy." By Mr. Neville Chamberlain, M.P.

10 a.m.—"The future design of road vehicles for passenger and goods services." By Sir J. E. Thornycroft, K.B.E.

7 p.m.—Dinner of the Institute.

FRIDAY, MAY 19.

10 a.m.—"The finance of the modern highway—a problem and a solution." By Mr. Dixon H. Davies.

10 a.m.—"Foreign railway practice." By Prof. J. Carlier.

11.15 a.m.—"'Safety' in railway operation." By Col. J. W. Pringle, C.B.

5 p.m.—"The operation of heavy suburban passenger services on a steam railway, with particular reference to the density of service, terminal and other facilities." By Mr. F. V. Russell, C.B.E. (This paper will be read at the rooms of the Society of Arts.)

Several prominent members of the Government will attend the annual dinner on May 18, and a distinguished company is expected. The speeches will be limited and an excellent musical programme has been arranged. The papers to be read at the Institution of Civil Engineers, as mentioned above, on the mornings of the 17th, 18th and 19th, cover a wide range of subjects and are of particular interest. While all are likely to be of considerable merit, three may be singled out as calculated to provoke valuable discussion, those by Mr. Neville Chamberlain, M.P., Sir John E. Thornycroft and Mr. Dixon H. Davies. A full attendance is anticipated at the lecture to be delivered at the Royal Society of Arts, on the 19th, by Mr. F. V. Russell, C.B.E. Space will not permit of a full description of the numerous visits arranged for the afternoons of the 17th, 18th and 19th, and on the Saturday following. Excellent provision has been made for the comfort of those participating. The following are a few instances of what have been arranged:

On Wednesday, the 17th, the party visiting the docks will travel by special train provided by the Great Eastern Railway, leaving Liverpool Street at 2.30 p.m. and, on arrival at Custom House, will inspect the tobacco warehouse. They will then embark on a tug, which has been placed at the disposal of the Institute by Mr. W. H. J. Alexander, and proceed through the new passage to the King George V. Dock, and steam round the Dock inspecting *en route* the entrance lock, jetties, sheds, equipment and dry dock, afterwards visiting the new double-storey shed and the models of improvement and development works. Tea will be served, and the party will re-embark on the tug and proceed by river to Custom House Quay, near the Tower of London. Visitors to the Neasden Power Station will travel by special train to Rickmansworth, where they will be entertained at luncheon by the Metropolitan Railway and will subsequently return to Neasden and inspect the Power Station. Those inspecting the new Great West Arterial Road will travel to Hounslow Barracks Station by District Railway.

On Thursday, the 18th, at the conclusion of the morning session, specially reserved omnibuses will convey delegates to the Chiswick Works of the L.G.O.C., where light luncheon will be provided by the Company. Afterwards, an inspection of the works will be made, to be followed by a visit to the power station of the Underground Railways at Lots Road, Chelsea. The same afternoon, another party will inspect the new offices of the London and South Western Railway, at Waterloo, and subsequently travel by special train to Feltham and be conducted over the Marshalling Yard. An alternative visit will be to the company's power station at Wimbledon.

On Friday there will be a choice of three exceptionally attractive visits. The London, Brighton and South Coast Railway will run a special train from Victoria to and from the London Terminal Aerodrome at Croydon. Among many sights to be seen will be the hangars, workshops and buildings of the several companies operating the Cross Channel Air Service. The London County Council will run special cars starting from the Victoria Embankment for those visiting the Greenwich generating station and car repair depot at Charlton, and will provide tea at Charlton. For those inspecting the Great Western Railway Company's signal works at Reading, special travelling facilities will be provided by the Company.

On Saturday, the 20th, an inspection will be made at Liverpool Street Station of the early-morning suburban traffic operation. Later on, three alternative visits have been arranged. The party visiting the works of Messrs. Dennis Brothers, at Guildford, will probably travel from and to London by motor conveyances. Those who elect to visit Euston Station and Stonebridge Park power station will also be entertained at luncheon by the London and North Western Railway, while those who proceed to Marylebone Station will witness a demonstration by the Great Central Railway of pulverised coal and colloidal fuel. Additional visits have been arranged to the Central and London Trunk Telephone Exchanges, the London County Council Housing Estate at Dagenham, and the Fuel Research Station at Greenwich. The Transport Exhibit at the South Kensington Museum will repay a visit, and is open on weekdays from 10 a.m. to 6 p.m. and on Sundays from 2.30 to 6 p.m. Those desirous of participating in the Congress are urged immediately to communicate with the Hon. Secretary of the Institute, at 15 Savoy Street, London, W.C.2.

ROAD MAINTENANCE.

NEW SUGGESTIONS BY WORCESTER COUNTY SURVEYOR.

At a meeting of the Institution of Municipal and County Engineers, held in London on April 20, Mr. C. F. Gettings, the Worcestershire County Council surveyor, read a paper entitled "Maintenance of Highways as Affected by Finance." With the exception of large cities of considerable area, Mr. Gettings suggested that economies could be effected if the country was divided into suitable areas, similar to counties, but avoiding the present interlacing, and the whole of the roads in the respective areas placed under one control. The roads should be classified, and grants made to the areas by the Treasury which should be proportionate to the classification and mileage of the roads. It might be suggested that a number of officials who held office at the present time would be affected; but it would be possible to absorb the majority, and in course of time the organisation could be so arranged that the administration would be more effective and economical than at present. If the method indicated were adopted it would be possible to co-ordinate the work in each area, and make better arrangements for the purchasing and distribution of materials. The heavy mechanical vehicle, whether omnibus or heavy lorry, was not contributing proportionately to the damage done to the roads, and it was only fair that increased funds should be derived from this source. The public, who used the motor omnibus, and who obtained goods that were conveyed by road transport, benefited indirectly, and it was only reasonable they should be called upon to contribute towards the cost of the roads. If the control of the highways was placed in the hands of one authority, comprised of representatives similar to a County Council, the administration might well be left in their hands, as more economical results would be obtained. It was desirable to have an impartial authority to arrange the distribution of grants.

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THE EDITOR will be glad to consider articles by experts. All information of a practical character relating particularly to the engineering and operating branches of transportation will receive prompt attention. Original illustrations will also be welcome.

LONDON, MAY 18, 1922.

Railway Electrification.

During April an official list was published of schemes which receive a Government guarantee both as to principal and interest of loans for carrying out new works. The guarantee arrangement, it may be recalled, is provided for in the Trade Facilities Act 1921, and the immediate object is to facilitate the raising of capital at a low rate of interest for new works of public utility, so that employment may be found for many men out of work. It is significant of the importance attached to electric railways that out of a total of £14,958,145 guaranteed for fourteen different industrial projects, no less than £11,500,000 should be for railway electrification and for the improvement and extension of existing electric railways. The guarantee in respect of £5,000,000 to the London Underground Railways had previously been announced. The main works to be carried out with this new capital are the enlargement of the tunnels of the City and South London Railway, the extension of the London Electric Railway from Golder's Green to Edgware, improvements of stations, and provision of new rolling stock. The works have long been authorised, and the plans matured, so that an early start is possible. The other guarantee is in respect of no less than £6,500,000 for the electrification of the suburban lines of the South Eastern and Chatham Railway. This will be one of the biggest single jobs of the sort hitherto carried out in this country, embracing as it does a network of lines over a wide area to the south-east of London. The general scheme has been worked out, so that it is probable no great delay will occur in making a start. The possibilities of traffic development, when the competition of the electric tramcar and the motor omnibus need no longer be feared, are very great, especially when it is remembered that the South Eastern and Chatham Railway has several large terminal stations in the heart of London. The two companies concerned may be expected not only to win back lost suburban traffic, but to create a great deal more in connection with places further out which will be brought in point of time much nearer both to the City and the West End. It is in connection with this electrification scheme that a construction company is to be formed to carry out the electric equipment and to work the electrified lines for a period of years under a leasing and sinking fund arrangement by which it is calculated the new capital will gradually be wiped out. Apart from the alleviating of unemployment, both of these schemes will be of great and permanent benefit to the public.

Electricity Supply.

Since last year a great deal of negotiation has been going on privately between the Ministry of Transport and various interests concerned in the Electricity Supply Bill, with the result that a great deal of the opposition to that measure has been withdrawn. This may be judged from the fact that the Bill has passed through the House of Lords (where it has been regarded with so much suspicion) with only a few amendments not of a vital kind. The main object of the measure remains, namely, to authorise the local joint electricity authorities which are being constituted under the Electricity Supply Act of 1919 to raise capital by borrowing. They should have had that power to begin with, but it is better late than never. Once the power has been obtained they will be

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able to proceed properly with their work of consolidating, co-ordinating and developing the supply of electricity for all purposes throughout the country. Without the power sought they could only work the finance of schemes indirectly by the constituent members represented on each authority raising capital. If the Government show themselves at all in earnest in the matter, they should have little difficulty in getting the Bill through the House of Commons this year. When passed, and taken along with the original Act, it should prove of great advantage to the country. It does not contain the general compulsory powers which had to be dropped from the original Bill of 1919, but though the powers are now voluntary or optional it is probable that the various districts will see that there are open such possibilities of benefit in the arrangements that generally speaking they will gladly adopt them.

The Transport Congress.

Those who come to London to attend the four days' Transport Congress which is being held from the 17th to the 20th of this month, will not only engage in proceedings that will be full of interest, but they will be invited to participate in a series of visits of inspection which are sure to prove exceptionally attractive. The programme arranged by the Institute of Transport includes tours of such varied centres of transport activity as the new Waterloo Station, the international air port at Croydon, and the London Docks. It is unlikely, however, that anything will eclipse in interest the visit of the delegates to the power-station of the Underground Railways at Lots Road, Chelsea. The observant visitor to London is usually impressed most of all by the remarkably smooth and efficient way in which the enormous volume of passenger traffic is handled, especially during the busy periods of the day. The man in the street—to use the term in its strictly literal sense—is, however, apt to forget when viewing the traffic the fact that there is always another great army of passengers being carried below his feet by the Underground Railways. Indeed, were it not for this vast network of lines, four alone of which last year carried 339 million passengers, it is difficult to conceive of the chaotic state in which London would find itself to-day. It is a significant fact that this underground system, so essential a part of the Metropolis, has been built up without Governmental assistance or even encouragement. The enormous sums necessary have been provided from private capital—not all of which has even yet become remunerative—and the system has been developed by careful study of London's needs, by an untiring spirit of enterprise, combined with the services of eminently skilful engineers. And so at the Lots Road station the visitors will see the splendid equipment which generates the power not only for practically the whole of the Underground Railways, but for several tramways associated with the Underground Group. To say that the great plant on the bank of the Thames represents the high-water mark of engineering attainment is to use no empty phrase. As was mentioned in the illustrated description of the power-house which appeared in our issue of October 20, 1921, the aggregate capacity of the ten turbo-generators is now over 78,000 KW. The two latest machines have an economic rating of 15,000 KW. and a full-rated continuous capacity of 18,000 KW., while the eight older generators have each an output of 6,000 KW. The visitors will also be interested in such new features as the circulating water service, with its large and ingenious screening pit for the removal of undesirable floating matter from the Thames water; the 14,000-ton coal storage tank; the elaborate coal-handling equipment, and the new machinery in the boiler feed-pump house. A feature of the boiler-house at Lots Road is that the boilers, which now number almost 70, are arranged on two floors. To visitors from the British Dominions and the United States especially the visit to Lots Road should be particularly attractive, as it can truthfully be said that the development of the power-station has been watched by engineers in every part of the world.

Proposed Underground Railway for Tokio.—The prospects of the scheme for constructing an underground railway in Tokio are receiving a good deal of attention at present, says the *Times of India*, owing to the difficulty of solving the traffic problem, which is acute. A motor omnibus service would be useless, the paper says, "owing to the state of the roads and the electric wires which run overhead lengthwise and crosswise." An underground railway is therefore generally desired, and as experimental borings have disproved a supposition that the subsoil is too soft, the feeling now is that the scheme will be successfully accomplished.

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SAFETY IN RAILWAY ELECTRIFICATION.

In the running of our railways the safety of the general public and of railway servants in particular should always receive unqualified support before considerations of mere economy. In justice, however, not only to ourselves but also to the representative list of engineers who composed the Electrification of Railways Advisory Committee to the Ministry of Transport, we dissent from some conclusions stated in the lecture on "Safety," with which we deal, at the length it deserves, on another page. That a report is stated to say nothing about the safety of permanent way workers cannot reasonably warrant the suggestion that the Advisory Committee, who prepared it, overlooked any aspect of the safety problem.

To assume that the Advisory Committee were willing to put even twice 1,500 volts "on third, and/or fourth, rails" is, in our opinion, unduly reading between the lines of their report. We consider where "multiples of 1,500 volts" were named in their report that no member of the committee had any intention that it should be located "near the ground." The Advisory Report states the committee received a report from Mr. George Gibbs, consulting engineer to the Pennsylvania Railroad and to the Delaware, Lackawanna and Western Railroad, etc., who was chief engineer on the electrification of the New York City suburban railway, from which company the Great Eastern Railway took its general manager. It is no secret in London that he also has reported on the electrification of the Great Eastern Railway Company's suburban lines. His recent public statement in Italy shows his opinion (which the lecturer quoted) that there are weighty objections to the use of even 1,200 volts in a third rail.

It is opportune to summarise the opinion of practical experts on the general problem of railway electrification.

The Advisory Committee's Final Report 1921, recognised the large financial expenditure already incurred on the Brighton Railway's single-phase equipment, and decided to leave it alone. More recently that company withdrew a Bill it had deposited for raising more capital for electrification.

American, as well as French, experts have decided that no higher voltage than 1,500 can be allowed "near the ground," also that the cost of 2,400 volt—or of 3,000 volt—electrification is in excess of both 600 and 1,200 volt electrification. These higher voltages are therefore ruled out both on the basis of safety to railway servants and on the basis of economy.

The French Government's committee who examined electrifications at home and in all other countries published a voluminous report which includes numerous and comparative estimates. That report is available partly in *Revue Generale des Chemins de Fer*, Paris, Vol. 40, pp. 313-352, and in "Institution of Civil Engineers' Abstract," 226, p. 148, October 1921.

Their estimates prove that "even the larger number of sub-stations for the lower voltage involves less total cost than the higher voltage." "The cost of 1,500 volt locomotives is lower than that of 2,400 volt or 3,000 volt locomotives." "No multiple unit equipments at 3,000 volts are in existence yet."

There are only three 3,000 volt electric railways in the world. Both use "overhead" contact. Locomotives draw passenger trains on them. They are the Chicago, Milwaukee and St. Paul Railroad (U.S.A.), Paulista Railroad (Brazil), and the Valparaiso, Santiago (Chile).

Up to the present electrification has been limited to three especial reasons—

(1) Tunnel ventilation not providing sufficient air for burning coal and keeping passengers supplied with sufficient oxygen.

(2) Heavy suburban traffic. Within a radius of 30 miles there is no need for more than 600 volts, and the Advisory Committee's report shows they expected London to continue and to extend the already considerable mileage running at 600 volts.

(3) Heavy grades. Regeneration of power from trains descending is also of value, and for regeneration at moderate speeds direct current is essential.

Three-phase regeneration is extremely simple, but only at speeds above synchronism, which means at speeds higher than the same train could run on straight, level track. Reasonable considerations of safety prevent risking such excess of speed to attain the advantage of a money saving in brake blocks, wheel and track wear.

The French report tells us where voltages above 1,500 might be preferable—note that they say "might be"—i.e., "in special cases where the traffic is *light*." We are satisfied that in such cases the steam locomotive is likely to continue to be the most economical method. "Special cases" exist in two feeder lines in Italy, now being electrified, to save long journeys over electrified lines to take steam locomotives to and from distant repair shops.

The 3,500 volt *overhead* equipment from Bury to Holcombe Brook on the Lancashire and Yorkshire Railway was experimental, and is no longer in existence.

The Electricity Commissioners, under their Act, deal with generation of electricity. Other officials in the Ministry of Transport are charged with providing for the safety of all of us. We feel confident that they will not permit voltages "within reach of anyone" which are more dangerous, or less safely protected, than the 1,200 volt third rail now in service on the Manchester-Bury line.

BUSINESS NOTICES.

THE JACK ENGINEERING COMPANY, of Ferdinand Place, Chalk Farm, London, N.W.1, now hold a full range of spare parts of all standard jacks. Parts required for replacement can, we are informed, be despatched immediately on receipt of application quoting type and number.

NOBEL INDUSTRIES, LIMITED, of Nobel House, S.W.1, have notified the Board of Trade that they propose to support the British section, which is being organised by the Department of Overseas Trade, in the Rio de Janeiro Exhibition, which opens on September 7 next. They will exhibit a range of products similar to those now installed for the inspection of visitors at the British and Latin American Chamber of Commerce, 39 Bedford Square, London, W.C.1.

"B.R.C. ROADS."—Under this title the British Reinforced Concrete Engineering Company, of Dickinson Street, Manchester, have issued an illustrated record of examples of their work, which sets an unusually high standard as a commercial publication. It contains 160 pages of excellent photographs taken in all parts of the British Isles and abroad, showing roads of every kind either under construction with B.R.C. fabric or in their completed state. There is little comment, for little is needed, as the captions under the illustrations show that most cities and towns of consequence realise the need for an efficient and durable method of road construction. In the preface, however, it is pointed out that B.R.C. tramway foundations, like the ordinary roadway foundations, afford a permanently level bed on which to build a lasting superstructure. The effect of the reinforcement is to spread the load over the whole width of foundation. Apart from its publicity uses, the book, which is charmingly finished in leather, may be regarded as a welcome contribution to the literature of road construction and maintenance.

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INTERNATIONAL UNION OF TRAMWAYS.

RECONSTITUTION AT BRUSSELS.

At the meeting of the International Union of Tramways (Union Internationale de Tramways, de Chemins de fer d'Intéret Local et de Transports Publics Automobiles), which was held at Brussels on February 18, M. C. Burlet, president, occupied the chair, and 128 members or their representatives were present. The president welcomed the members, and thanked particularly those who had come from a distance to assist at the reconstitution of the Union. At the outset he referred to the death of two members of the Council, M. A. Bertini, director general of the "Societa Generale Italiana Edison di Elettricita," Milan, and M. J. H. Neiszen, director of the Amsterdam Municipal Tramways. They were, he said, not only well known in the tramway world and able engineers, who had taken great part in the work of the Union, but men of sound counsel and always cordial and courteous in their relations with their colleagues. Upon the invitation of the president, the members rose as a sign of respect for the two late members.

The President then recalled the circumstances which had arrested the work of the Union during many long months. Many colleagues anxiously desired to resume the work. It was the very lively desire of the Council, who had suffered more than anyone from the long period of enforced inaction. To-day, thanks to the promulgation of the Belgian law relative to the liquidation of sequestered property, every obstacle to the dissolution of the old Union and its reconstitution had finally disappeared. The President addressed an urgent appeal to all his colleagues to lend their best assistance to the new organisation which the committee proposed to form, in order to continue the useful work of the Union. The President then gave an explanation of the procedure to be followed in the dissolution of the old Union, and the assembly unanimously adopted the following resolution —

> "The assembly, taking note of the dissolution of the International Union according to the law of November 17, 1921, approves the division of the assets which has been made. The part falling to members from the central countries has been transferred to the special account required by law and by the treaty of Versailles. The assembly decides that the remainder of the property shall be invested in the reconstituted Union under reservation of eventual rights of old members not adhering to the new organisation."

The President then proposed the constitution of the new international association and examination of the articles, taking as a basis for this work the articles of the old international union, which had proved so satisfactory during many years. These articles were unanimously adopted after careful discussion.

M. K. Norregaard proposed that they should adopt French and English as official languages of the association. The President explained that at present there were only a few English members, and owing to reasons of economy he thought it wise at the moment to limit the official language to French. This was agreed to.

The President announced that the former committee of the Union had addressed to the members of the old Union not represented on the committee a request that they should appoint a delegate to represent them on the Council of the new association. The following list, drawn up in this way, was submitted for the approval of the assembly —

FORMER MEMBERS.

BELGIUM.—MM. C. de Burlet, Directeur Général honoraire de la Société Nationale des Chemins de fer Vicinaux; H. Géron, Administrateur de la Compagnie belge de Chemins de fer et d'Entreprises; J. Kessels, Administrateur de la Société Générale de Chemins de fer Economiques; Ch. Thonet, Administrateur, vice-président de la Société Anonyme d'Entreprise Général de Travaux.

FRANCE.—MM. A. Mariage, Président du conseil d'administration, Administrateur-délégué de la Société de Transports en Commun de la Région Parisienne; G. Pavie, Administrateur de la Compagnie Générale Francaise de Tramways.

SWITZERLAND.—M. Ch. Rochat, Directeur Général de la Compagnie Genevoise des Tramways Electriques.

NEW MEMBERS.

DENMARK.—M. Kai Norregaard, Directeur des Tramways de Copenhague.

SPAIN.—M. le marquis de Foronda, Administrateur, Directeur Général des Tramways de Barcelone.

FRANCE.—MM. F. Level, Directeur de la Compagnie Générale de Voies ferrées d'intérêt local; L. Boulle, Administrateur-délégué de la Compagnie Général Francaise de Tramways.

HOLLAND.—M. J. W. van de Vegt, Directeur de la Société des Tramways Electriques de Rotterdam.

NORWAY.—M. J. F. S. Barth, Ingénieur, Directeur de la Société des Tramways Electriques de Christiania.

On the motion of M. L. Sékutowicz, the members of Council were elected with acclamation. Several Belgian members then expressed the wish that one or more representatives of the "Federations des Tramways Electriques de Belgique" and of the "Union des Cessionnaires d'Exploitation des Chemins de fer Vicinaux," who are directly connected with traffic direction, should be admitted to the Council at a convenient opportunity. The President was agreeable to the suggestion, and only regretted that it was not made at a suitable moment. He promised that it should receive favourable consideration. On the motion of the president, the assembly confirmed the election of M. le baron L. Garssen as "Honorary President" in recognition of his great services over a long period.

The assembly unanimously decided that the next congress should be held in Brussels in the first fortnight of October 1922. M. Koettlitz moved that the following motion should be included in the agenda—"To establish the extent of damage done in various allied countries that were devastated or occupied during the war." He was requested to submit his proposal in writing, and the president explained that for lack of time to issue the usual schedules of questions, it would be necessary to limit discussion at the congress to subjects covered by papers which members would submit. The Council would be responsible for the necessary arrangements.

The General Secretary gave a summary of the financial position of the Union, which was regarded as satisfactory.

The agenda being exhausted, the President again thanked the many members present for the declaration of their desire for the continuance of the valuable work of the Union. He asked all to support the new association, and to establish interest in it wherever possible, that it might be strong in the accomplishment of its objects to effect improvement in the means of transport, and so conduce to public prosperity.

M. Level (president du Comité Central de l'Union des Voies Ferrées d'intérêt local et de Transports Publics Automobiles de France) thanked the president in the name of the assembly; he expressed the delight of all at meeting after so long and terrible a separation in glorious Belgium, the symbol and the martyr of the great war.

THE BEAMA CABLE CODE.

The British Electrical and Allied Manufacturers' Association, whose headquarters are at 36 and 38 Kingsway, W.C.2, have issued what is bound to prove a most useful and economical Technical Cable Code, with a view to facilitating and cheapening the transmission by telegraph of business correspondence and data. Regarded in the first place merely as the product of the printer and binder, the book, which is published at five guineas, is a very substantial and imposing piece of work. From the binding to the outer edge of the cover it measures 14½ inches; from top to bottom, 11½ inches; and the two stout red covers may be expected adequately to fulfil their purpose in withstanding the wear occasioned by frequent reference. The 200 pages are of thick parchment-like ledger paper; the printing is bold and clear, and the numerous tables conveniently arranged and well displayed. A noteworthy feature is the adoption of loose-leaf binding, which will permit subscribers to add fresh sections as they are published.

The publication of the code has arisen from the long standing need of the principal exporting houses connected with the Association, who desired a code which would be at once comprehensive, accurate, and economical. Most of the cable codes at present in existence are designed to meet the general requirements of business, and none of them is especially intended to cover technical details such as are used in connection with quotations and tenders for electrical and other machinery. There was a distinct need for a technical code which would meet such cases. Many of the larger manufacturers have private codes for their own branch of industry, but these codes necessarily contain references to their own standard types, and are designed to meet their special requirements, so that even if published they would be of limited usefulness.

The new Beama Code is based on work by the author, Mr. John F. Shipley, M.I.E.E., but has been amplified by specialists connected with firms in the association who are in daily contact with both the technical and commercial sides of their business. The phrases used in the code are therefore such as regularly occur in inquiries and contracts; they have been made as comprehensive and complete as possible. The work has also been submitted to the coding experts of various companies in the B.E.A.M.A., so that difficulties that arise with existing codes have been avoided. The terms given in the code cover all branches of electrical and allied engineering and are in accordance with the latest practice, references being given to all standardisation rules, both British and Foreign. The publishers estimate that as compared with any other code now published, it will be possible with the Beama Code to reduce the number of coded words by approximately 75 per cent. The initial cost of a few copies of the code, they expect, will be covered in the first half dozen messages transmitted, particularly if these be long-distance communications.

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MANCHESTER TRAMWAYS MANAGERSHIP.

MAJOR HENRY MATTINSON APPOINTED.

Major Henry Mattinson (late R.E.), chief civil engineer of Manchester Corporation Tramways, has been appointed general manager in succession to Mr. J. M. McElroy, whose resignation, owing to ill-health, was reported in our issue of February 25, 1922. Mr. Wood, assistant manager, is also about to retire. There were 39 applicants for the post, and the Tramways Committee interviewed two of these, besides Mr. Mattinson—Mr. E. S. Rayner and Mr. J. S. D. Moffet, the general managers of Hull and Belfast tramways respectively.

Major Henry Mattinson.

The appointment carries a salary of £1,400 a year, and Mr. Mattinson will commence his duties on July 1.

The new manager has been associated with the Manchester Tramways for 21 years, and has been chiefly responsible for the construction of almost the whole of the 220 miles of single track which the system possesses. When Mr. McElroy visited the Continent and America to study traffic conditions, Mr. Mattinson accompanied him, and afterwards collaborated with him in preparing reports. Mr. Mattinson served his articles in Leeds, and before going to Manchester held appointments under the Corporations of Hull and Wolverhampton. He is an Associate Member of the Institution of Civil Engineers, a member of the Institute of Municipal and County Engineers, and a member of the Institute of Transport. During the war Mr. Mattinson obtained further professional experience in the army abroad, and gained the rank of major. He joined the East Lancashire Royal Engineers in 1915, and acted as adjutant at the Carnarvon R.E. training centre. Later, he served with the Egyptian Expeditionary Force between Gaza and Aleppo, and as construction engineer, light railways, directed the construction of over a hundred miles of track in this region. Following the defeat of the Turks in 1918, Major Mattinson was placed in charge of the restoration of the 600 miles of captured railway from Haifa to Damascus, Beirut, and Aleppo.

BELFAST TRAMWAYS' CHAIRMAN HONOURED.

Councillor W. G. Turner, chairman of Belfast City Tramways Committee, and an ex-High Sheriff of the city, has been honoured with a civic presentation in recognition of his distinguished municipal services. Councillor Turner has for many years served on the City Council, and in 1920 he was unanimously elected High Sheriff. At the conclusion of a term of office marked by a keen sense of public duty and generosity, it was felt that his services should be recognised. This popular decision had a sequel on April 27, when two portraits of himself were presented to Councillor Turner—one for inclusion in the permanent gallery at the City Hall, and the other for his own home. In addition, the chairman of the Tramways Committee received an illuminated address, in album form, while Mrs. Turner was the recipient of a diamond and sapphire cluster ring. The presentation ceremony was held at the City Hall, which had been charmingly decorated for the occasion. Alderman S. T. Mercier presided, and among those present were the Lord Mayor and Lady Mayoress (Sir William and Lady Coates), the High Sheriff, and many of Councillor Turner's colleagues and friends, including the general manager of the tramways (Mr. J. S. D. Moffet).

The address gave expression to the feelings of admiration and esteem which the donors so warmly entertained for Councillor Turner. "As High Sheriff for the County of the City of Belfast in 1920," it read, "your year of office was a busy and arduous one, but you fulfilled the duties and responsibilities of the position in a manner which elicited the highest praise from your colleagues in the City Council and the citizens generally. Reference may be made to the dignity and ability with which you presided over many important meetings, to the courtesy and tact which you always displayed in the discharge of your manifold duties, to the generous aid which you extended to all movements for the general welfare of the city, and to the marked success which attended your chairmanship of the Tramways Committee. In social and philanthropic projects Mrs. Turner took an active part, and never spared herself in her efforts to assist the needy and suffering."

In his formal reply, Councillor Turner spoke of the gratitude with which he received the gifts, and added, "I prize more than I can express the approbation of my colleagues in the City Council and the citizens generally. You are also good enough to refer to my chairmanship of the Tramways Committee, a position which I have the great privilege of holding now for the fifth year; such a privilege is a distinction of which one may pardonably be proud, and it is gratifying to know that my efforts are regarded with so much approval. I warmly appreciate your kindly references to my wife, and on her behalf, as well as my own, I most heartily thank you for these tributes of your confidence and goodwill."

The Lord Mayor said Councillor Turner had been for many years a greatly appreciated colleague of his in the City Council. He was a man on whom they could thoroughly rely, and one to whom they could go when they were in difficulty. The High Sheriff (Councillor Harry M'Keag) said he desired to join with the Lord Mayor and the chairman in their expressions of congratulation to Councillor and Mrs. Turner. As one who had served in the Corporation with Councillor Turner, he realised the great services he had rendered to the city. Particularly as chairman of the Tramways Committee had his services been of value. The Right Hon. Sir James Johnston said it had been his pleasure and privilege to be associated with Councillor Turner during all his public career.

Others who testified to Councillor Turner's valued services included Alderman Sir Crawford M'Cullagh, M.P., Alderman J. A. Duff, M.P., Councillor D. Anderson, and the Rev. W. J. Baird.

Councillor W. G. Turner
(*Chairman Belfast City Tramways Committee*).

Councillor Turner supplemented his formal reply by saying that in the discharge of his duties as a member of the City Council he had received every assistance at the hands of all the officials. He had often said, and he sincerely believed, that, taking their chief officers as a whole, from the genial Town Clerk down, there was no city in the United Kingdom which had a better staff for ability, loyalty, and devotion to duty.

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WAGES AND CONDITIONS OF TRAMWAY EMPLOYEES.

LIVERPOOL CORPORATION TRAMWAYS.

NEW WORKING CONDITIONS—AGREEMENT WITH EMPLOYEES.

The following is the text of an agreement as to working conditions, etc., which was entered into between Liverpool Corporation Tramways Committee and their employees on March 22, 1922.

Clause 1.—The working week shall consist of six days of eight hours per day, inclusive of signing on and signing off.

Clause 2.—(*a*) Every employee except those required to sign the spare sheet shall be guaranteed a working week of 48 hours, inclusive of signing on and signing off, or payment equivalent thereto, subject to such employee presenting himself for work at the appointed time on each of the six days, provided that this condition shall only apply to men who were in the tramway service on or before December 31, 1921; (*b*) Employees who shall have joined, or who shall join the serivce after December 31, 1921, shall, for the purpose of the foregoing condition, be treated as spare men; (*c*) Employees who shall be required on any day to sign the spare sheet, shall be entitled, if they do not receive any duty on such day, to an allowance of four hours pay for such day, and employees who shall be required to sign the spare sheet for six days in any week shall be entitled to receive such a sum as, with such allowances as aforesaid, will amount to 32 hours' pay; (*d*) At no time shall there be more than 10 per cent. of the drivers and conductors on the spare sheet. Such 10 per cent. shall not include men who have been placed on the spare sheet for disciplinary reasons; (*e*) When any employee has been on the spare sheet—except those placed thereon for disciplinary reasons—for such time as entitles him to the maximum rate of pay, *viz.*, two years, he shall be treated as a full-time employee, and shall be guaranteed 48 hours pay per week.

Clause 3.—The Corporation shall be at liberty to utilise the services of any employee for whom work cannot be found on the cars upon such other work as may be considered desirable by the Corporation, subject to such other work not infringing on another man's job, and only being of a temporary character.

Clause 4.—Spread-over time shall be reduced to the lowest possible minimum, consistent with an efficient service, and in no case shall such spread-over exceed 12 hours per day.

Clause 5.—Overtime shall be calculated as time and a quarter for the first two hours, and time and a half for all hours afterwards. Each day shall stand alone as regards the payment of overtime.

Clause 6.—Ordinary Sunday work shall be paid for at the rate of time and a quarter.

Clause 7.—Any employee being called upon to work on his seventh or rest day shall be paid at the rate of time and a quarter on the rate prevailing on that day.

Clause 8.—The following days shall be recognised as National Bank Holidays—Easter Monday, Whit-Monday, August Bank Holiday, and Boxing Day, when time and a half shall be paid for all time worked.

Clause 9.—Christmas Day and Good Friday shall be paid for at the rate of double time, calculated on ordinary day rates. If any employee shall not be required to work on Christmas Day or Good Friday, he shall receive a day's pay, calculated on ordinary day rates, for each of such days on which he does not work.

Clause 10.—Eight days' holiday with pay shall be granted to all employees after 12 months' continuous service. In calculating such holiday, rest days shall not be included.

Clause 11.—No employee shall be entitled to payment in lieu of holiday.

Clause 12.—The adult rate of pay shall only apply to employees aged 21 years and over. Employees under the age of 21 years shall be paid on the scale at present in operation.

Clause 13.—The working week of night shed assistants shall consist of 48 hours, such hours to be inclusive of a meal-time of not less than 30 minutes each night. Shed assistants on day work shall be granted a working week of 47 hours.

Clause 14.—Shed assistants on regular night work shall be paid 1s. per night extra for night work, and shed assistants under the age of 21, 6d. per night extra for night work.

Clause 15.—(*a*) The present sliding scale revision of wages shall be continued in accordance with the changes in the cost of living Board of Trade index figure giving a variation of 1s. per week for every complete five points either way in the published figure for the month preceding that in which the revision is to take place, commencing from the figure of 135; (*b*) The next revision of wages shall take effect as and from the beginning of the first full pay period following May 1, 1922, and such revisions as shall have taken place previous to this agreement shall be taken into account in calculating the next revision; (*c*) After the next revision of wages shall have taken place, subsequent revisions shall take place every three months.

Clause 16.—In the event of a stoppage in the tramway service, whether complete or partial, from causes beyond the control of the Corporation, such as stoppages due to disputes, serious breakdown of machinery, etc., the guaranteed week shall be suspended, and only the actual time worked shall be paid for.

Clause 17.—This agreement shall come into force on April 4, 1922, and shall continue in force until revised or determined, but no revision or determination thereof shall be made unless and until three months' notice of such revision or determination shall have been given by the Corporation or the Employees as the case may be, and no such revision or determination shall take place before September 30, 1922.

Clause 18.—This Agreement shall not apply to employees whose wages and conditions of labour are governed by other Trades Unions Agreements and Awards.

RATIFICATION OF TRAMWAY AGREEMENT.

At a meeting of the National Joint Council for the tramway industry on April 11, reports of the constituent associations respecting the revised National Agreement were received. Mr. Fearnley reported that there was no dissentient among the municipal tramway authorities, and Mr. Tegetmeier reported that the conference of Tramway and Light Railway Companies had recommended to the companies concerned the adoption of the agreement. Mr. Cliff reported that the employees had by a majority decided to accept the agreement.

A question was raised as to the meaning of the words "this date" referred to in clause 2 (*a*) of the revised agreement, and it was resolved that the words "this date" be construed as the date of the signing of the agreement, viz., April 11, 1922. The committee recommended that the terms and conditions of service of the permanent way employees who had been working under the March, 1919, agreement, should be the subject of local negotiation and agreement between the undertakings concerned and the trade union representatives.

The resignation of Mr. W. J. Squires was accepted with regret, and the best thanks of the Council were accorded to him for his splendid services as chairman of the Council since it was formed. Mr. J. M. McElroy's resignation was also accepted with regret, and the Council placed on record their appreciation of his services and untiring devotion to its interests. Mr. A. L. C. Fell and Mr. John Barnard were elected members of the Council.

TRAMWAY EMPLOYEES' WAGE REDUCTION.

The National Joint Council for the Tramway Industry notified its members on April 20 that in view of the cost of living figure for April having fallen to 82 per cent. over that of August, 1914, reductions would be made in wages on and from the commencement of the first full pay period in May, 1922, as follows—Employees aged 18 and over, 2s. per week (making a total reduction of 10s. per week); employees under 18 years of age, 1s. per week (making a total reduction of 5s. per week).

An adjustment was also made at the same date on the sliding scale in respect of youths between 14 and 19 years of age, in accordance with the agreement of February 15, 1922. As this agreement provided for a revision at the rate of 3d. per week for every five points, rise or fall, in the cost of living from 100 per cent. as a datum figure, the reduction was at the rate of 9d. per week from the following scale—

Age.	Basic	Bonus.	Total.
14—15	10s. 0d.	5s. 0d.	15s. 0d.
15—16	12s. 0d.	5s. 0d.	17s. 0d.
16—17	14s. 0d.	5s. 0d.	19s. 0d.
17—18	18s. 6d.	5s. 0d.	23s. 6d.
18—19	24s. 0d.	5s. 0d.	29s. 0d.

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FINANCIAL REPORTS AND MEETINGS.

ROCHDALE TRAMWAYS DEFICIT.—There was a loss of £19,500 on Rochdale Corporation tramways last year.

MIDDLESBROUGH TRAMWAYS DEFICIT.—There was a deficit of £26,000 on the working of Middlesbrough Corporation tramways for the year ended March 31, 1922.

ENGLISH ELECTRIC COMPANY, LIMITED.—The directors recommend a dividend of 5 per cent. on the ordinary shares for 1921, as compared with 8 per cent. for the previous year.

CITY OF BUENOS AYRES TRAMWAYS COMPANY (1904).—A dividend of 1s. 3d. per share (being at the rate of 5 per cent. per annum), less tax, for three months ending March 31 last, has been declared.

BEXLEY AND DARTFORD TRAMWAYS.—There is an estimated deficiency on the Bexley Urban District Council Tramways and Dartford Light Railways for the year ended March 31, 1922, of £2,887.

HADFIELDS, LIMITED.—A final dividend of 6d. per share has been declared, making with the interim dividend 5 per cent., free of tax, for the year. The dividend for the previous year was 5 per cent., and in the preceding year it was 10 per cent.

BURY TRAMWAYS LOSS.—The draft annual balance sheet of Bury Corporation Tramways shows a loss on working during the last twelve months of £12,461 on the Bury sections, £1,943 on the Radcliffe section under the first agreement, and £913 17s. under the second agreement.

RANGOON ELECTRIC TRAMWAY AND SUPPLY COMPANY.—A dividend has been declared of Rs. 1 per share on the ordinary shares, free of tax, to shareholders domiciled in India or Burma, making Rs. 1½ for the year. A sum of £30,000 is placed to reserve for renewals, and £12,969 is carried forward.

CARDIFF TRAMWAY RECEIPTS.—The general manager of Cardiff Corporation Tramways (Mr. R. L. Horsfield) has reported that for the past year the passenger receipts on the tramcars were £277,835, a decrease on the previous year of £13,054. The number of passengers decreased by 2,525,232 to 40,114,675. There was also a decrease in the wages bill of £5,651, which brought it to £157,678 for the year. The fall in income he could only account for by the depression in trade and the interference with the ordinary traffic by reason of the reconstruction of the track.

GREENOCK AND PORT GLASGOW TRAMWAYS COMPANY.—The annual report shows that after providing for all expenses chargeable to revenue, including £2,377 for mortgage interest, amounts payable under agreements with corporations amounting to £1,479, and setting aside £15,675 for renewals, there is a surplus on year's working of £7,482, making, with £410 brought forward, £7,893, which directors propose should be appropriated as follows—To sinking fund for loan redemption, £1,796; to reserve, £1,000; to dividend of 5 per cent. on preference shares for the year to December 31; balance to be carried forward, £1,597.

BRADFORD CORPORATION TRAMWAYS.—The receipts of Bradford Corporation tramways for the year ended March 31, 1922, were £709,900, as compared with £702,108 for the previous year, an increase of £7,792. The following figures were recently presented to the committee, those in parenthesis being for the year 1920-21—Average receipts per car mile, 27·78d. (26·54d.); mileage run—tramways and railless 6,132,403 (6,347,404); passengers carried—tramways and railless, 79,620,044 (88,865,557); journeys per annum per head of population (based on 370,000 population), 215 (240); number of days worked 356 (364)—the decrease of eight days being due to the coal strike last year; the number of parcels carried, 771,448 (740,699).

METROPOLITAN-VICKERS ELECTRICAL COMPANY, LIMITED.—The annual meeting was held in London on April 5, Mr. J. Annan Bryce (the chairman) presiding. Mr. Bryce said the profit available for the year was £440,342, or nearly £40,000 in excess of that of 1920, which he thought was satisfactory in view of the depression in trade. Orders received were considerably fewer than in the preceding year, but the shops were kept fully employed owing to the number of orders remaining unexecuted at the beginning of the period. As a result of the year's operations, they were enabled, after allocating £35,000 to special depreciation and raising the general reserve to £400,000, to increase the carry forward by £33,991. The output of the year had been the largest during the history of the company, exceeding by 35 per cent. the output of 1916. Mr. Bryce mentioned that it had been decided to invite Mr. Douglas Vickers, head of the great organisation which bore his name, to take the vacant place on the board of directors.

ARGENTINE TRAMWAYS AND POWER COMPANY.—The report for year to September 30, 1921, states that the gross receipts of the tramway department were 690,657 dollars (paper), an increase of 128,271 dollars (paper). Gross receipts of light and power department were 336,314 dollars (paper), an increase of 66,447 dollars (paper). Net receipts from operation totalled £28,028, an increase of £5,442. Profit on exchange was £255. Including interest and transfer fees, the revenue was £28,559, against £26,893. After charging interest and sinking fund on debenture stock and London expenses, and transferring £5,000 to reserve for renewals, there remains £10,245. A scheme of arrangement approved by holders of preference and ordinary shares on March 22 provides, *inter alia*, that £18,323 standing to the credit of revenue account at September 30, 1920, shall be carried to reserve and shall not be treated as profit available for dividend. Subject to scheme being approved by the Court and to £50,000 of five per cent. debenture stock, subscriptions for which have been conditionally promised, being allotted, the directors propose dividend at the rate of 5 per cent. (less tax) on preference shares in respect of the past year, carrying forward the balance, subject to income tax and corporation tax (if any).

BRUSH ELECTRICAL ENGINEERING COMPANY.—The annual meeting was held in London, Mr. E. Garcke (chairman) presiding. The chairman said the directors were glad to be able to report a further substantial improvement in the general prosperity of the company. Including the amount brought forward from the previous year, they had a total profit balance of £374,585. It was proposed to apply to deprecitation of buildings, plant, patents, etc., £15,000, to pay a further 4 per cent. interest on the prior lien participating debenture stock, and to add to the reserve fund £73,190, bringing it up to £150,000, and to pay a dividend on the ordinary shares of 15 per cent. for the year. They were fortunate in entering 1921 with a good order book, and despite the coal strike the output for the year was the largest in the history of the company. Referring to the development of the company's Brush Ljungstrom turbo-generator plant, Mr. Garcke said the merits of the design were now generally recognised, and evidence of the economies which it effected in steam consumption continued to accumulate. The company's output in transformers was also a record for the year, and the products of this department appeared to have given general satisfaction to buyers, both as regarded efficiency and reliability. On the rolling stock side the output was well maintained. They were well equipped for securing their fair share of any business offering, not only as regarded tramcars and trucks and motor omnibus bodies, but also of railway rolling-stock.

LEEDS CITY TRAMWAYS.

Alderman R. A. Smithson, Chairman of the Leeds City Tramways, submitted to the Tramways Committee on April 24 a financial statement of the results of working of the Leeds City Tramways for the year ended March 31, 1922. A summary of the results is appended—

	Year ended March 31, 1922.	Average per car mile. 1922.	Year ended March 31, 1921.	Average per car mile. 1921.
	£	d.	£	d.
Traffic revenue	953,906	24·546	989,690	23·340
Sundry revenue	5,797	·149	5,947	·140
Total revenue	959,703	24·695	995,637	23·480
Working expenses	702,250	18·070	729,345	17·200
Gross profit	257,453	6·625	266,292	6·280
Add Interest on Investments	15,978	·411	26,895	·634
Bank Interest	177	·004	2,423	·57
From Unemployed Grants Com. ...	2,451	·063	...	...
	276,059	7·103	295,610	6·971
Against which is charged—				
Loan charges	132,164	3·401	128,337	3·027
Do., Sovereign St. estate	3,818	·098	3,818	·090
Do., Burmantofts property	135	·003	135	·003
Revenue contribution to capital outlay	1,561	·040	2,059	·049
Rental of Morley Light Railway ...	2,701	·069	2,596	·061
Income Tax	38,385	·988	52,832	1·246
Permanent way renewals	140,561	3·617	100,211	2·363
	319,325	8·216	289,988	6·839
Surplus or deficit...	—43,266	—1·113	+5,622	+·132

The total receipts, miles run, etc., are appended—

	Year ended March 31, 1922.	Year ended March 31, 1921.	Increase or Decrease.	Per Cent. of Increase or Decrease.
Total receipts	959,703	995,638	—35,935	3·609
Miles run	9,326,755	10,176,874	—850,119	8·353
Passengers carried	129,707,972	138,621,331	—8,913,359	6·430
Receipts per mile	24·695d.	23·480d.	+1·215d.	5·170
Average fare paid per passenger ...	1·741d.	1·696d.	+·045d.	2·653
Population served	557,000	557,000	...	...
Number of times population carried ...	233	249	—16	6·426
Amount paid per head of population ...	33/9	35/2	—1/5	4·028

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TRAMWAY AND LIGHT RAILWAY NOTES.

BARROW-IN-FURNESS.

REDUCED FARES.

A revised scale of fares and stages has been approved by the Town Council. Penny fares are introduced, and higher fares are proportionately decreased. The manager (Mr. J. R. Groves) estimates that the approximate reduction in revenue for the year will be £1,581, and the approximate increase in expenses £1,334, a total of £2,915.

BIRMINGHAM.

THE CORPORATION BILL.

The Birmingham Corporation Bill, which includes clauses relating to railless trolley vehicles, tramways and omnibuses, came before the Local Legislation Committee of the House of Commons, and the clauses alluded to were unopposed. Mr. Tyldesley Jones, K.C., said the Corporation were faced with the question whether they were going to spend a large sum of money on reconstructing the Nechells tramway route, or were going to provide an alternative method of transport. The promoters asked that they should be authorised to run trolley vehicles over the route. Mr. Erskine, for the Ministry of Transport, said the proposed trolley vehicles were more of the nature of tramways than motor omnibuses, and the Ministry thought that the promoters, in seeking to extend the trolley vehicle system, should proceed by Provisional Order. Mr. Tyldesley Jones said the Corporation sought powers to run trolley vehicles anywhere. He suggested that the powers under the Bill should be confined to the routes on which the Corporation were running tramways to-day, and that, in the event of powers being sought to run trolley vehicles elsewhere, they should have to apply for powers by Provisional Order. Mr. Erskine assented. Mr. A. Baker (general manager of the Corporation tramways) gave evidence in support of the tramway clauses. He stated that the cost of reconstructing the Nechells route was estimated at £90,000. The tramway clauses were agreed to.

BLACKBURN.

NO CHEAPER FARES.

Two members of the Town Council asked for a reduction of 1½d. tramway fares to 1d., on the ground that wages had been reduced, as well as the price of steel. Alderman C. Higham (chairman of the Tramways Committee) replied that the reductions had not made the lowering of fares justifiable.

BRADFORD.

PENNY FARES NOT FAVOURED.

Mr. R. H. Wilkinson, general manager of the Corporation tramways, reported against a proposal to reintroduce penny fares, and stated that the present 2d. minimum is the main source of revenue. "It brings in 57 per cent. of the total passenger receipts," he said, "and any alteration thereto would seriously jeopardise the stability of the undertaking."

BRISTOL.

TRAMWAY COMPANY'S BILL.

The Bill promoted by the Bristol Tramways and Carriage Company came before a Select Committee of the House of Commons on May 2. Its purpose is to extend the time limited by an Order of the Minister of Transport for the compulsory purchase of lands which the company were already authorised to acquire; also to extend the time limited by the Order of 1921 for the construction and completion of certain tramways. Mr. W. G. Verdon Smith (managing director) gave evidence. The preamble was found to be proved, and the Bill passed the Committee.

BURNLEY.

TRANSPORT MINISTRY AND "REVERSED" STAIRS.

Councillor Eastwood (vice-chairman of the Tramways Committee) has reported that he and the general manager (Mr. H. Mozley) interviewed representatives of the Ministry of Transport and urged the withdrawal of the Ministry's prohibition of "reversed" staircases on new tramcars. The Ministry intimated their intention of adhering to their prohibition.

DEARNE VALLEY.

LIGHT RAILWAY SCHEME.

The Dearne Valley light railway scheme was alluded to at a meeting of Wombwell Council, when the clerk stated, in reply to a question, that the Council was pledged to support the project. The chairman explained that the scheme received much opposition in its Parliamentary stages, and since that time the work had been held up by the high cost of materials. As soon as things became normal he presumed that the work of construction would proceed.

DONCASTER.

TRACK DOUBLING.

The Corporation have decided to apply to the Ministry of Transport for sanction to borrow £2,150 for the doubling of the single tramway track from the loop in Arksey Lane to a bend in High Street on the Doncaster side of the Bentley Mill Bridge.

DUNDEE.

PROPOSED TRACK RECONSTRUCTION.

The general manager and engineer of the Corporation tramways (Mr. W. T. Young) has reported that an expenditure of £59,000 on track reconstruction and rail hardening is desirable. The matter has been referred to a special committee.

EDINBURGH.

PRINCES STREET CENTRE POLES—ROUTE EXTENSIONS.

In the House of Commons on April 10, Mr. Neal stated that he had received the report of the inquiry carried out by the Ministry of Transport into tramway traction at Edinburgh. He had decided to adopt the recommendation that the request of the Corporation for permission to put up centre poles to carry the overhead electrical equipment in Princes Street and to alter the position of the rails on the northern side of the street should be granted. The report, Mr. Neal added, would be published if desired. The Tramway Committee are consulting the Director of the College of Art and his colleagues on the question of the decorative design to be used on the one-piece tapering poles which will be erected in Princes Street, and as to the most suitable type of lamp to be suspended from the poles. The Corporation are to apply to the Secretary for Scotland for a Provisional Order under the Private Legislation Procedure (Scotland) Act 1899, for power to construct and maintain tramways, to acquire lands for improvements, and for other purposes. Among the estimates prepared for the proposed new undertakings are the following—In connection with the tramways, £105,144; for conversion to electric traction of the remaining sections of the Corporation tramways, £110,644; for tramway equipment, cars, other rolling stock, and depots, £314,367. Seven new tramway routes are projected, and are expected to be completed within seven years. Power is also sought in the Order for the transfer to the Corporation of the tramway and electrical undertakings of the Musselburgh and District Electric Light and Traction Company Limited.

GATESHEAD.

NEW CARS.

The Gateshead and District Tramways Company recently put into service five new single-deck cars of very roomy proportions and pleasing design. It is understood that seven additional double-deck top-covered cars will shortly supplement the company's rolling stock.

GLASGOW.

OFFER FOR PAISLEY SYSTEM—CORPORATION ORDER.

The Corporation Sub-committee on Tramways Extensions decided on April 26 by five votes to four to recommend the Tramways Committee and the Corporation to offer £250,000 for the tramway undertaking of the Paisley District Tramways Company. An amendment was that an offer of £200,000 should be made. The committee on May 3, however, decided to recommend a continuance of consideration of the proposal to purchase the undertaking until a special meeting of the committee on May 19. In the meantime the general manager (Mr. J. Dalrymple) was instructed to arrange that all members of Glasgow Tramways Committee should be given facilities to inspect the Paisley undertaking. At a special meeting of Glasgow City Council approval was given to the Glasgow Corporation (Tramways, etc.) Order 1922. The Order seeks power, among other things, to authorise the Corporation to take over and work the tramway undertaking of the Airdrie and Coatbridge Trustees, acquired by the Corporation at a cost of £82,250, and to acquire further borrowing powers for tramways.

HALIFAX.

NEWSPAPERS ON THE CARS.

The Tramways Committee is entering into an agreement with the local Newsagents' Wholesale Supply Company for the carriage of newspapers on the cars at a charge of £80 per annum.

HASTINGS.

PENNY FARES.

Hastings Tramways Company, Limited, introduced a number of penny stages on their system on Sunday, April 23, and withdrew the 1½d. stages.

HUDDERSFIELD.

NEW OMNIBUS SERVICE.

The Corporation opened its new omnibus service from Honley to Holmfirth and Holmebridge on April 15, when the members of the Huddersfield Tramways Committee, Mr. A. A. Blackburn, the general manager, and members of the tramway staff travelled by the new omnibus from the tramways office to Holmfirth, where they were joined by the chairman, Councillor G. H. Tinker, and other members of the Holmfirth Urban District Council. Councillor Tinker, in welcoming the representatives from Huddersfield, said that they were inaugurating a service which was bound to be a benefit to both communities. The new omnibuses of the Huddersfield Corporation were a credit to Huddersfield, and they provided an excellent means of seeing the beautiful country through which

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they passed. They all regretted that the late chairman of the Tramways Committee (Alderman Sellers) had not lived to see the inauguration of the service. The new omnibuses have been supplied by Karrier Motors, Limited, of Huddersfield.

HULL.

Letter Boxes on Cars.

The Tramways Committee propose to make an experiment in placing letter boxes on cars on two routes for about two months. A suggestion has been made that the Post Office should make a payment of £30 per annum while the experiment is in operation.

LIVERPOOL.

Presentation to Veteran Tramway Man.

A presentation was recently made at the Lambeth Road Carriage Works of the Corporation Tramways to Mr. Robert Bulman on the occasion of his retirement after over 40 years' service with the city tramways, including 15 years with the old tramways company. The general manager (Mr. P. Priestly) handed to Mr. Bulman a gold watch, chain and pendant and gold sleeve links, with a silver chain bag for Mrs. Bulman. Mr. Priestly referred to the fact that Mr. Bulman had had the unique experience of assisting in the building of practically every type of tramcar since their inception in this country.

LLANDUDNO.

Electric Railway Strike Ends.

The strike of employees of the Llandudno and Colwyn Bay Electric Railway Company, which commenced on February 18, has been amicably settled as a result of the intervention of a representative of the Labour Ministry.

LONDON.

Through Services—Royal Commission and Tramways.

The tramway systems of the London County Council and the London United Tramways have now been linked up at Hammersmith by the laying of a short length of track in the Broadway. The new service under the through-running agreement between the two undertakings has commenced, and the route from the borough of Southwark to Kew affords one of the longest through services by tramway in London. Starting from the Hop Exchange, near London Bridge, cars run by way of Wandsworth, Putney, across Putney Bridge, through Fulham Palace Road, and from Hammersmith over the London United Company's line to Kew, with a corresponding return service. The following alterations in the London United Tramways service have been made—The Hounslow and Hammersmith service is diverted to Shepherd's Bush; the Shepherd's Bush and Kew service is projected to Brentford (G.W.R. Station) on weekdays (Mondays to Fridays); the Hampton Court service, however, continues to run as hitherto to Hammersmith. The following further alterations also came into operation on May 2—The Tooting and Hampton Court service does not run beyond Wimbledon Station; the London County Council Tramways have introduced a new service from the Embankment *via* Merton to Wimbledon Station (about ten miles), connecting at that point with the London United Tramways service Kingston, Hampton Court, etc. On Mondays to Fridays, the mid-day fare is 2d. all the way between the Embankment and Wimbledon Hill. On the Kew Bridge through service, mid-day passengers can travel at 2d. between Central London and Hammersmith Broadway, and thence, paying ordinary fare, 3d. to Kew Bridge. At the resumed sitting of the Royal Commission on London Government on April 25, evidence was given by Sir Herbert Nield, K.C., M.P., chairman of the Parliamentary and County Building Committees of Middlesex County Council. Mr. Robert Donald, a member of the Commission, questioned Sir Herbert with regard to the lease of Middlesex Tramways to the Metropolitan Electric Tramways Company, and suggested that it had resulted in a loss to the county. Witness did not agree.

MANCHESTER.

Fare Reduction—Contribution to Rates.

The City Council have confirmed the Tramway Committee's recommendation that a reduction be made in fares by increasing the length of the existing penny stages. The committee originally had before them a proposal by the general manager (Mr. J. M. McElroy) that the reduction should be made on two routes only, as an experiment. Mr. McElroy suggested that the penny stages should be lengthened from a mile and a quarter to a mile and a half for a period of two months. It was ultimately decided, however, that the trial should apply to all routes. If the test proves successful, tramway fares in Manchester will revert to the level at which they stood before the last increase was made. On the journey from the city to Heaton Park, Middleton or Withington, for instance, there will be a reduction of a halfpenny on the present fare. The accounts presented to the committee showed an approximate expenditure for the year ended March 31 last of £1,994,551, or £43,449 less than the estimate. The estimated revenue for the current year was £1,894,495—a reduction on last year, in view of the probable loss on the new fares, of approximately £100,000. The Tramways Committee decided to allocate £50,000 to the relief of rates.

NOTTS AND DERBY.

The Tramway Company's Bill.

The Nottinghamshire and Derbyshire Tramways Bill came before the Unopposed Bills Committee of the House of Commons on May 3. The Bill seeks powers for the construction of additional tramways intended to link up the main system of the company with the Ilkeston tramways. It was also proposed to reconstruct part of the tramways so that the whole system would be run on standard gauge. The cost of new construction would be £72,000, for new cars and equipment £38,000, for the completion and purchase of tramways £19,000, and for the purchase of the Ilkeston Tramways £80,000. After formal evidence, the Bill was passed for third reading.

SALFORD.

The Charge for Energy to the Tramways.

At a meeting of Salford Ratepayers' Association on May 2, Mr. F. Marsh, one of the elective auditors, complained that the Electricity Committee charged the tramways 2d. per unit for current. In the past year the current used for running the cars cost £82,614, and if the charge were reduced by one halfpenny per unit the Tramways Committee would make a surplus of £20,000 per year more. Reference to the matter was made at a meeting of the Corporation on May 3, when the chairman of the Electricity Committee denied that they were exploiting the Tramways Committee. If the latter felt aggrieved, let them have a friendly arbitration. Councillor F. Jones said he was prepared to prove that the charges were lower in Manchetsr than in Salford.

ST. HELENS.

Extension of Track.

The Tramways Committee have decided to lay a double line of track from Croppers Hill to the borough boundary and to relay the track in Church Street. For these purposes application is being made for a loan of £40,000.

SHEFFIELD.

Economy Effected by Employees' Early Holidays—Ecclesall Extension.

By means of reductions in salaries and curtailing the programme of work of committees, the Sheffield Corporation on April 12 took steps which are estimated to effect a reduction in the rates of 1s. 9d. in the £. The recommendations were made by the Economy Committee, presided over by Sir Wm. Clegg, who is also chairman of the Tramways Committee. Referring to the tramway proposals, Sir William said that there would be a saving of thousands of pounds by the men taking their holidays now instead of later. This step would obviate the necessity for calling in extra men to take their places. In reply to a complaint of the alleged bad state of the tracks, coupled with the taking of £5,000 from the tramways fund, Sir William stated that £50,000 had been reserved for renewals. Regarding the Corporation officials, he said they had consented to a reduction for two years, after which they would revert to their original position, subject to what the Council of that date might say. The Economy Committee, he added, was going to continue their work, and he invited suggestions.—The Ecclesall extension of the Corporation Tramways has been put into use, and cars now run beyond the old terminus at Banner Cross to the top of Millhouses Lane (Silver Hill). The extension serves a new housing area.

SOUTHPORT.

Tramways and Omnibus Proposal.

A special sub-committee of the Tramways Committee which considered the advisability of running motor omnibuses, reported that it is undesirable to substitute omnibuses for the present tramway service, owing to the heavy expenditure required for omnibuses, the extra capital and maintenance cost on the roads as compared with the present maintenance of the tramway track, and the loss to the electricity undertaking in revenue. There were no districts in the borough, the sub-committee added, where it would at present pay to run omnibuses as an adjunct to the tramway system. The Town Council deferred consideration of the report for a month.

SUNDERLAND.

Tramway Strike Ended.

A settlement was effected on April 21 of the strike of employees of the Sunderland District Electric Tramways, Limited, which had been in progress for eleven weeks. As the result of the intervention of Alderman Robert Richardson, M.P. for the division, a conference took place between representatives of the company and of the employees. It will be remembered that the cause of the strike was the decision by the company to effect a wage reduction in excess of that provided for by the National Agreement. In view of the serious decrease in their revenue, they contended that they were unable to continue to pay the then existing wage bill, and sought a reduction which, in the case of the higher paid men, amounted to 10s. a week. At the conference referred to an agreement was reached that the men accept a reduction of 5s. per week, but that no further decrease take place when the national wages scale was revised at the beginning of May.

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WEST HAM.

MANAGER'S REPORTS ON FARE QUESTION.

Mr. M. L. Slattery, general manager of West Ham Corporation Tramways, recently presented two reports to his committee—one on the operation of the 2d. maximum midday fare and the other on fares generally, to both of which brief reference was made in our issue of April 29. In the first report he gives statistics which show that after allowing for assumed "economic" loss, due to the present condition of trade, there was an increase in the number of 2d. passengers of 615,697, and a decrease in the number of 3d. and higher of 788,789 for the 33 weeks to March 30 last, representing a fall in revenue of £6,464, equivalent to £10,085 for a complete year. It cannot be claimed, Mr. Slattery adds, that the operation of the 2d. midday fare has been the success the Council anticipated. In his report on fares generally, the manager cites the falling off in traffics on various tramway and railway systems, and remarks that it appears that this decrease is universal, and must be primarily attributed to the present economic conditions. He is strongly of opinion that any curtailment or concessions in fares at West Ham could only result in a deficiency which would have to be made up from the rate account. Having regard to the financial position of the undertaking, and the uncertainty of the future, he cannot recommend any alteration in fares at the moment.

WOLVERHAMPTON.

REDUCTION OF MINIMUM FARE.

The Tramways Committee recommended that the 2d. minimum fare be reduced to 1½d., and the Town Council confirmed the recommendation. The tramways general manager and engineer (Mr. C. O. Silvers) estimated that were the 2d. minimum retained there would be a credit balance of £8,438, but with the 1½d. minimum there would be a deficit of £3,562. The committee considered that they were justified in this recommendation only by the overriding necessity to make every possible contribution to a further fall in the cost of living.

CONTRACTS AND ORDERS.

Aberdeen Town Council propose to purchase two 6-ton Leyland motor lorries at £1,130 each.

Tilling-Stevens Motors, Limited, are supplying a double-deck omnibus to Blackpool Watch Committee.

Manchester Corporation have accepted the tender of Walter Scott, Limited, for steel girder tramway rails.

Cravens Railway Carriage and Wagon Works have an order from Edinburgh Corporation for tramcar top covers.

Salford Electricity Committee have ordered from the Metropolitan-Vickers Electrical Company, Limited, two 6,000-volt switch cubicles.

Sheffield Corporation proposes to ask for sanction to borrow £30,000 for the construction of a garage for electric vehicles and the equipment of the cleansing depot.

Newport (Mon.) Tramways Committee have accepted the following tenders—Messrs. Wettern Brothers, for 300 tons of setts; Messrs. Walter Scott, Limited, Leeds, for 250 tons of rails.

Edinburgh Town Council have accepted the tender of the Metropolitan-Vickers Electrical Company, Limited, for motors and of the English Electric Company, Limited, for controllers.

Keighley and Leyland Omnibuses.—Keighley Tramways Committee have recommended that two of the omnibuses at present on hire from Leyland Motors, Limited, be purchased at £1,575 each.

Bradford Tramways Committee have accepted the tender of Millars' Timber and Trading Company, for the supply of a "tructractor" at £505, and three trailer-tipping wagons at £12 10s. each.

Wolverhampton Electricity Committee have accepted the tender of the Stirling Boiler Company for two 40,000 lbs. water tube boilers, and that of the Underfeed Stoker Company, Limited, for four mechanical stokers.

Islington Cleansing Committee have recommended the purchase of four 2½-ton electric vehicles for refuse collection from the General Vehicle Company, Limited, at a total cost of £5,200, and a 4-ton petrol lorry from Commercial Cars, Limited, at a cost of £877.

Welsh Highland Railway.—Messrs. M'Alpine have secured the contract for the construction of the Welsh Highland Railway for a sum of nearly £60,000. It is expected that the section between Dinas and Beddgelert will be completed by Whitsuntide, and that from Beddgelert to Portmadoc by July.

Calcutta Electricity Supply Corporation is reported to have placed several contracts under a Trade Facilities Act guarantee to the amount of £250,000. Among the contracts are the following—English Electric Company, Limited, 15,000 kw. turbo-generator; Stirling Boiler Company, Limited, boilers; British Thomson-Houston Company, Limited, transformers; W. T. Henley's Telegraph Works, cables.

Johannesburg Municipal Council have accepted the tender of Hadfields, Limited, for the supply of 500 standard tyres for tramway cars at £4 4s. 3d. each (total value, £2,106 5s.), and of the Continental and Colonial Commercial Company, Limited (lowest), for the supply of 20 rolled steel tyres for pony wheels of bogie tramcars, at £2 17s. 6d. each (total value, £57 10s.).

Metropolitan-Vickers' New Zealand Order.—A Reuter message from Wellington, New Zealand, states that the Government has accepted the tender of the Metropolitan-Vickers Electrical Company, of Manchester, amounting to £30,764 for the supply of switch gear for the Mangahao hydro-electric installation, which will provide the Wellington district and city with electrical power. The installation will have the highest electrical pressure in Australasia and the best and most reliable controls were necessary. The lowest tender received was one for £24,666 from America.

Sandberg "Insitu" Rail Hardening Process.—The Scholey Construction Company, Limited, 56 Victoria Street, S.W.1, have secured a contract for the "Insitu" treatment of 2¼ miles of track for the Newcastle Corporation Tramways. They are also carrying out extensive contracts for the Wallasey, Liverpool, Leeds and Hastings tramways. Messrs. Elder Smith & Company, Limited, of London and Sydney, have obtained a contract for the "Insitu" treatment of three miles of track for the New South Wales Government tramways in Sydney. Orders received up to date include the treatment of 150 miles of tramway track on the following undertakings—Croydon, Bournemouth, Glasgow, Leeds, Manchester, Sheffield, Liverpool, Newcastle, Birmingham, Metropolitan Electric, Bristol, Derby, Reading, S. Shields, Bolton, London County Council, Edinburgh, Bury, Birkenhead, Wallasey, Bradford, Cardiff, Hastings, Sydney (N.S.W.), London United, Paris.

PERSONAL.

Lieut.-Colonel J. A. Cole, deputy chairman and managing director of Humber, Limited, has been elected president of the Society of Motor Manufacturers and Traders, in succession to Sir Alfred Mays-Smith.

Major-General Sir Frederick H. Sykes, G.B.E., K.C.B., C.M.G., has been appointed a director of the Underground Electric Railways Company of London, Limited, the London General Omnibus Company, Limited, and the Associated Equipment Company, Limited.

Mr. R. H. Pitts, O.B.E., has been appointed to act as staff officer for the London Underground Companies. His duties in this connection will be in addition to those he has previously filled as Secretary of the Joint Standing Committee of the grouped companies.

Mr. H. H. Lancaster, executive officer of Blackpool Corporation Tramways, has been appointed traffic superintendent of the undertaking, in succession to Mr. Charles I. Baker, now manager of Ashton-under-Lyne Corporation Tramways. There were 58 applicants for the Blackpool vacancy.

Mr. C. I. Baker entered upon his duties as manager of the Ashton-under-Lyne Corporation Tramways on May 1. Prior to his departure from Blackpool he was presented by Councillor H. Brooks (chairman of the Electricity and Tramways Committee), on behalf of the Electricity and Tramway Employees' Institute, with a cheque. The tramway employees have presented Mr. Baker with an oak grandfather's clock.

Councillor H. Salmon, the manager of the Expanded Metal Company, whose works are at West Hartlepool, has been appointed chairman of the West Hartlepool Tramways Committee in place of Alderman R. Martin, who, owing to failing health, resigned from the Tramways and Electricity Committee. Alderman R. Martin, J.P., who has been a member of this local governing body for the last 23 years, occupied the chief civic chair for two years, 1911 and 1912, and held the chairmanship of the Tramways Committee for nine years.

Alderman Sir William E. Clegg, J.P., chairman of Sheffield Corporation Tramways and Motors Committee, received the Freedom of the City on April 21—his seventieth birthday—in recognition of long and distinguished services to Sheffield. As was noted in our issue of March 11 last, it is principally in connection with the development of the tramways that Sir William's work for the city is known. He was appointed chairman of the committee when that body was formed in 1896, and during his term of office the motor omnibus system was successfully inaugurated.

Mr. E. S. Rayner, general manager of Hull Corporation Tramways, was recently offered by the committee a salary of £1,200 per annum as from July 1 next, rising by three annual increments of £100 to £1,500, such salary not to carry any bonus. Mr. Rayner, whose present basic salary is £800 with bonus, declined the offer. It will be recalled that he was one of the three candidates recently interviewed by Manchester Tramways Committee with a view to the appointment of general manager in that city, and that the position was filled by the appointment of Major H. Mattinson.

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Mr. Joseph A. Bromley, general manager and engineer of Keighley Corporation tramways, has been appointed general manager of the York Corporation tramways at a salary of £600 per annum, in succession to Mr. J. W. Hame, resigned. Mr. Bromley gained much of his experience on the Leeds undertaking, where he held the post of chief assistant rolling-stock superintendent before going to Keighley at the beginning of last year. Here he set himself to improve the services of both tramcars and railless trolley vehicles, introducing the queue system, and subsequently arranging motor omnibus services on the Oakworth and Sutton routes. His knowledge of railless traction will, of course, find scope at York, where a system of this type was introduced over 12 months ago.

Mr. J. B. Hamilton and His World Tour.—Mr. J. B. Hamilton, general manager of Leeds Corporation Tramways, whose return from a tour round the world was noted in our issue of April 15, mentioned in a local interview that, in the course of his travels, he had seen all the systems of transport in the Northern Hemisphere. Everything pointed to a still greater development of electric traction. "Railless cars," he said, "are being largely used in Shanghai, where they are to be still further exploited, and the same form of traction is extending in various parts of America." New York had an excellent service of motor omnibuses, the vehicles being of the same type as those running in London. In America generally, he said, the tramways are suffering from the same disabilities that afflict British concerns, especially high costs of operation, which have gone up in an even greater ratio than in this country. In the United States some of the tramway systems with fixed tariffs were in the hands of receivers. The one place above all others where there has been no development in transport was Pekin. The streets were planned some 500 years ago, he believed, and they were on lines which would delight the hearts of our modern city engineers, but the methods of transport were the same as when the place was laid out, and probably for 500 years before that.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given in italics.

APPLICATIONS FOR LETTERS PATENT.

The number of the patent is given in brackets.

Axle and spring connecting means for heavy motor vehicles, etc. (9,815)—V. G. Barford and J. I. Thornycroft and Company, Limited.
Electric motor control (9,982)—British Thomson-Houston Company, Limited, and C. T. Hanna.
Trailer brake connection for vehicles (9,595)—C. F. Cleaver.
Current collectors (9,769)—N. Clough.
Systems of electric traction and suspension means for overhead conductors therefor (9,770)—N. Clough.
Machine for dressing rails (9,640)—J. W. Eunson and Woods Gilbert Rail Remodelling Company, Limited.
Motor vehicle bodies (10,018)—T. Jones and H. Smith.
Anchoring conductor rails for tracks (9,579)—W. H. Meyrick.
Rail joint (9,492)—A. R. Pearson.
Transmission mechanism for motor vehicles (10,072)—L. D. Smith.
Bodies of motor vehicles (10,238)—Bucks Mechanical Transport, Limited, and H. J. Wood.
Tramcars, road vehicles, etc. (10,243)—W. P. Durtnall.
Locking device for steering mechanism of motor vehicles (10,289)—G. FitzGibbon.
Motor vehicles (10,636)—R. Harrison and Son, Limited, and W. B. Thomas.
Fishplate for tramway rails (10,161)—F. O. Harwood.
Lifting jacks (10,134)—G. A. Mortier.
Controlling mechanism of electrically propelled vehicles (10,220)—P. A. H. Mossay, Mossay and Company, Limited, and Ransome Sims and Jefferies, Limited.
Steps for omnibuses, tramcars, etc. (10,701)—W. C. Pengelly.
Driving mechanism of motor vehicles (10,248)—H. Singleton.

SPECIFICATIONS PUBLISHED

1920

Bodies of motor vehicles (33,657—*176,462*)—F. E. Pike.
Registering ticket punches (33,749—*176,464*)—F. Mathews and S. D. Black.
Tramcars and omnibuses (33,869—*176,466*)—J. A. Davenport.
Internal combustion engines for motor vehicles (34,438—*176,487*)—W. Fisher.
Transmission and brake mechanism of power propelled road vehicles (34,744—*176,514*)—F. W. Lanchester.
Steering devices for vehicle wheels (36,335—*176,563*)—S. Rawlinson.
Motor vehicles (33,487—*176,851*)—S. S. Guy.
Self-propelled vehicles (35,330—*176,890*)—R. Venzlaff, W. Von Mumm and A. Von Mumm.

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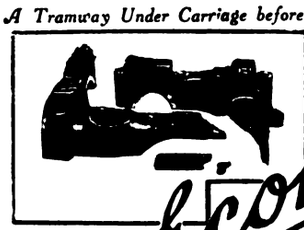
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Apparatus for printing and issuing tickets for fare systems (29,408—*177,191*)—Johnson Fare Box Company and A. J. Tanner.
Controlling apparatus for self-propelled vehicles (32,581—*177,563*)—C. Lamb, C. E. James and Leighton Motor Company.
Brake mechanism for vehicles (36,514—*156,588*)—M. Stringer, G. T. Bauder and A. E. Merkel.

1921

Bodies for motor road vehicles for carrying passengers (3,363—*176,601*)—E. F. Knight.
Axle boxes and bearings for tramcar vehicle wheel axles (10,833—*176,697*)—Hoffmann Manufacturing Company, Limited, and T. W. Cooper.
Lifting jacks (18,502—*166,138*)—A. Triou.
Motor vehicle suspension (23,353—*176,732*)—O. R. Dunnet.
Change-over apparatus for operating electrically propelled vehicles with different voltages (14,790—*163,998*)—Akt.-Ges. Brown, Boveri et Cie.
Fare systems and means used therewith (20,619—*167,482*)—A. J. Tanner.
Steering devices for motor road vehicles (391—*156,509*)—M. Birkigt.
Lubrication of motor vehicles (13,086—*163,044*)—B. H. Skelly.
Current collecting shoes (13,668—*177,433*)—J. D. Twinberrow and H. E. Gaze.
Tramcar seats and seat backs (2,346—*177,629*)—S. J. Aukland.
Motor vehicles (11,677—*177,722*)—A. E. Rouvier.

T.O.T. PHILHARMONIC SOCIETY.

SEVENTH EVENING CONCERT.

As is usual on such occasions the Central Hall, Westminster, was crowded on April 4 at the seventh evening concert of the Philharmonic Society, which is composed of members of the staff and employees of the Underground and allied companies. It may be stated for so young an organisation the advance shown in choir, military band and orchestra was most creditable. Their achievement is the more notable remembering that for combined rehearsals the members have to travel from all parts of the metropolis, and that many of them have spent a day at their work on train, omnibus and tramway car, or in the garages.

Another good sign is that the society is not above profiting from criticism. In commenting on their Victory concert given in the Royal Albert Hall, we suggested that notwithstanding the pleasure which is given to both audience and members alike by the engagement of first-class artistes, there would be greater satisfaction afforded if the three sections of the society sustained more items. This change was effected with success on this occasion, for out of a programme of thirteen numbers the society was responsible for nine.

The professional contributors were Miss Dorothy Greene (soprano), Mr. Edward Dykes (bass), and Mr. Norman Long (entertainer). They proved so popular that early in the second half of the programme encores had to be barred both for individual and collective numbers. The society's contributions were of great variety, and the high standard achieved in each reflected credit on the conductors and their forces. Besides taking part in the massed performances, the band were heard in Auber's overture, "Le Macon," and "Chimes of Joy," under the baton of Lieutenant J. Ord Hume, L.F., the latter item being his own composition. They also performed excerpts from Gounod, directed by Mr. A. Goodfellow.

The choir first appeared in selections from Coleridge Taylor's "Viking Song." With the orchestra they rendered Percy E. Fletcher's arrangement of "Reminiscences of Verdi." These items were conducted by Mr. Ewart Beech, who also took them through two numbers from "Les Cloches de Corneville." Planquette's opera is but rarely heard in these days, and the excerpts were done justice to. The first selection was the inaugural chorus, the soloists being Miss Queenie Thomas (Serpolette) and Mr. A. Tilston (Gobo). The second was the solos and duets sustained by Gaspard (Mr. A. Tilston), Marquis (Mr. G. J. Nicoll), Grenicheux (Mr. L. Russell), and Germaine (Miss Queenie Thomas). The selection closed with the two choruses, "Silent Heroes" and the ever popular "Ding, Dong."

Under the direction of Mr. C. F. Lambert the orchestra acquitted themselves with distinction in three pieces of a classical type. The first was Schubert's unfinished symphony in B Minor, the second Walford Davies's "Solemn Melody," and Handel's Largo, Mr. C. R. Rooney being at the organ. Towards the close of the programme Lord Stuart of Wortley, in the unavoidable absence of Lord Ashfield, the president, thanked the members for giving so delightful a concert, and complimented them and the conductors upon the improvement which was a feature of each succeeding entertainment.

The directorate were represented by Mr. H. A. Vernet, the Right Hon. Viscount Knutsford, Messrs. G. Watson, D. Duff, H. Kerr Thomas, Cater Scott, and H. E. Blain, C.B.E. Officials of the companies present were Messrs. F. Pick, W. A. Agnew, J. Ashby, P. V. McMahon, J. B. Mackinnon, A. Rozier, G. J. Shave, C. J. Spencer, J. F. Thomas, S. J. Webb, and H. Lansdown.

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TRAFFIC RETURNS.

Tramway and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1921. WEEKS ENDED April 9	April 16	April 23	April 30		1922. WEEKS ENDED April 8	April 15	April 22	April 29		AGGREGATE. Wks.	1921-22.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	3,782	3,668	3,461	3,622	...	3,274	3,346	3,298	3,299	...	47	165,674	– 14,376
Aberdeen Motor Buses	62	59	62	60	...	142	140	135	148	...	47	10,426	+ 8,757
Ayr Corporation	586	585	484	658	...	465	506	687	629	...	50	34,195	– 2,754
Barrow Corporation	872	863	792	927	...	578	594	733	575	...	4	2,482	– 976
Belfast City Tramways	12,632	12,953	12,495	13,214	...	11,986	12,142	12,409	11,967	...	4	48,504	– 2,790
Birkenhead Corporation	2,522	2,554	2,556	2,566	...	2,450	2,433	2,677	2,534	...	4	10,804	– 523
Birkenhead Motor 'Buses	508	478	529	609	...	543	682	811	668	...	4	2,899	+ 510
Birmingham Corporation	30,808	30,688	29,877	31,642	...	28,624	27,464	28,495	28,227	...	4	118,176	– 15,074
Birmingham Motor 'Buses	2,011	1,964	1,865	2,189	...	1,681	1,624	1,931	1,692	...	4	7,260	– 1,534
Blackburn Corporation	2,613	2,550	2,428	2,523	...	2,231	...	3,134	2,286	...	4	10,816	– 1,519
Bradford Corporation	13,745	14,599	13,518	15,108	...	13,157	13,622	15,232	13,775	...	5	58,814	– 3,513
Burnley Corporation	3,265	2,946	1,481	1,448	...	3,281	3,784	3,366	3,184	...	—	—	—
Burton-on-Trent Corporation ...	612	632	586	605	...	528	563	535	554	...	4	2,323	– 292
Bury Corporation	2,485	2,570	2,712	2,878	...	2,193	2,674	2,529	2,419	...	4	10,596	– 1,350
Chatham and District	1,793	1,713	1,525	1,642	...	1,515	1,602	1,887	1,538	...	17	25,108	– 2,646
Chesterfield Corporation	...	2,228	1,296	1,327	...	...	1,865	1,400	1,238	...	3	4,503	– 347
Derby Corporation	2,237	2,213	2,214	2,328	...	2,074	2,115	2,230	2,011	...	4	8,867	– 1,107
Dundee City	3,301	3,351	3,179	3,358	...	2,885	2,848	3,006	2,895	...	49	155,235	+ 2,450
East Ham Corporation	2,178	2,178	2,005	2,028	...	2,156	2,186	2,209	2,097	...	4	9,046	+ 349
Edinburgh Corporation	...	...	...	...	...	11,565	11,919	11,856	11,371	...	50	619,407	– 44,325
Edinburgh Motor 'Buses	...	...	...	...	...	3,249	3,454	3,390	3,278	...	50	174,902	—
Glasgow Corporation	47,552	47,782	46,982	50,000	...	44,878	43,758	43,596	44,588	...	47	2,140,981	– 17,750
Glossop (Urban Elec. Supply Co.)...	225	234	239	252	...	211	258	246	217	...	17	3,885	– 155
Halifax Corporation	3,655	3,988	3,950	4,103	...	2,375	3,887	5,166	3,994	...	3	15,424	– 273
Halifax Motor 'Buses	93	97	104	102	...	32	59	66	57	...	3	213	– 183
Halifax Railless Cars	...	...	...	...	...	33	41	84	52	...	3	210	—
Huddersfield Corporation	5,080	5,033	5,006	5,657	...	4,930	4,986	6,510	5,012	...	5	26,378	– 1,063
Ilford U.D. Council	1,456	1,501	1,408	1,525	...	1,452	1,536	1,491	1,466	...	4	6,252	+ 196
Ipswich Corporation	867	832	773	876	...	758	861	843	732	...	4	3,335	– 139
Isle of Thanet...	805	681	596	694	...	562	627	1,303	814	...	29	18,720	+ 760
Kilmarnock Corporation	366	356	344	372	...	313	319	329	322	...	49	17,507	– 915
Leicester Corporation	6,401	6,385	6,103	5,761	...	7,172	7,540	7,464	7,257	...	17	122,109	+ 12,316
Liverpool Corporation	29,981	28,258	23,049	25,198	...	28,699	27,956	29,551	28,958	...	17	489,012	+ 13,811
London County Council	103,424	102,342	95,614	100,073	...	92,244	92,804	91,925	91,640	...	3	341,402	– 30,747
Maidstone Corporation	894	458	435	441	...	788	426	509	400	...	3	2,123	– 105
Manchester Corporation	50,803	37,851	37,523	40,607	...	43,149	36,212	37,804	36,955	...	4	154,120	– 4,596
Newcastle-on-Tyne Corporation ...	11,077	10,978	10,764	10,874	...	9,614	9,567	10,672	9,519	...	4	41,500	– 3,917
Nottingham Corporation	7,630	7,357	7,085	5,976	...	6,481	7,875	7,946	7,456	...	4	29,760	+ 1,710
Oldham Corporation	4,356	4,592	4,212	...	...	4,379	4,733	4,908	...	...	4	19,915	– 784
Preston Corporation	1,701	1,961	1,857	1,717	...	1,264	1,724	1,967	1,767	...	3	6,721	– 515
Preston Motor 'Buses	...	...	...	...	...	92	128	145	123	...	3	488	—
Reading Corporation	1,453	1,604	1,536	1,531	...	1,303	1,583	1,584	1,495	...	4	5,968	– 158
Reading Motor 'Buses	281	306	272	301	...	262	333	396	317	...	4	1,309	+ 151
Rotherham Corporation	2,640	2,164	2,093	2,093	...	2,121	2,076	2,349	2,182	...	3	6,607	+ 258
St. Helens Corporation	1,169	1,775	1,628	1,671	...	893	1,498	1,827	1,496	...	4	5,715	– 529
Salford Tramways	10,400	10,380	10,864	11,557	...	9,883	9,811	11,200	10,171	...	4	43,890	– 2,783
Sheffield Corporation...	19,180	18,805	19,656	18,083	...	17,360	17,799	18,836	18,090	...	4	77,172	– 4,743
Southampton Corporation	2,796	3,124	2,990	2,706	...	1,926	2,891	3,213	3,035	...	4	11,067	– 550
Southampton Motor 'Buses	80	88	87	168	...	71	102	100	103	...	4	377	– 46
Southend Corporation	1,720	1,864	1,723	1,592	...	1,413	1,967	3,065	2,148	...	4	8,595	+ 1,695
South Shields Corporation	...	1,394	1,362	1,449	...	...	1,726	1,715	1,655	...	4	7,117	+ 797
Sunderland Corporation	4,051	2,443	2,013	2,034	...	3,204	2,428	2,546	2,306	...	4	10,485	– 58
Swindon Corporation	417	365	346	374	...	335	338	398	343	...	3	1,309	– 135
Tyneside Tramways and Tramroads	1,154	1,100	1,025	1,087	...	817	799	1,467	749	...	17	13,750	– 6,372
Wallasey Corporation	2,653	2,640	2,570	2,785	...	2,369	2,404	2,897	2,523	...	4	10,609	– 955
Wallasey Motor 'Buses	160	223	164	239	...	214	192	284	196	...	4	940	+ 57
Walsall Corporation	1,656	1,643	1,583	1,628	...	1,612	1,658	1,855	1,556	...	4	7,058	– 119
Walsall Motor 'Buses	951	870	823	839	...	888	920	1,170	817	...	4	4,042	+ 130
Walthamstow U.D. Council	2,013	2,020	1,747	2,114	...	1,771	1,976	1,896	1,769	...	4	7,786	– 340
Warrington Corporation	1,034	1,047	1,008	1,041	...	975	1,025	993	981	...	4	3,974	– 156
West Ham Corporation	6,123	6,083	5,757	6,106	...	5,528	5,877	6,267	5,523	...	3	22,409	– 1,660
Wolverhampton Corporation ...	1,993	2,187	2,120	2,218	...	1,657	2,232	2,603	2,189	...	4	8,682	+ 163
Wolverhampton Motor 'Buses ...	546	569	560	588	...	506	628	851	626	...	4	2,612	+ 349

Underground Electric Railways Company of London, Limited.

NAME OF COMPANY.	1921. WEEKS ENDED April 9	April 16	April 23	April 30		1922. WEEKS ENDED April 8	April 15	April 22	April 29		AGGREGATE. Wks.	1922.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Underground Rlys. & L.G.O. Co. ...	239,225	236,503	220,423	240,293	...	215,020	218,060	225,339	229,211	...	17	3,629,718	– 278,703
London and Suburban Traction ...	54,007	53,568	48,596	55,342	...	46,873	50,634	52,264	50,223	...	17	796,542	– 70,219

Colonial and Foreign Tramway Traffic Returns.

Companies Issuing Weekly Returns.

NAME OF COMPANY.		1921. WEEKS ENDED April 9	April 16	April 23	April 30		1922. WEEKS ENDED April 8	April 15	April 22	April 29		AGGREGATE. Wks.	1922.	Increase or Decrease.
		£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine		80,859	85,004	85,103	81,423	...	85,650	79,509	86,710	86,636	...	17	1,421,179	+ 53,598
Calcutta	Rs.	87,417	89,625	88,477	86,280	...	112,650	105,536	107,108	107,116	...	17	1,804,821	+ 645,547
Madras...	Rs.	(2 weeks)	49,568	(2 weeks)	49,668	...	(2 weeks)	56,445	(2 weeks)	48,502	...	17	396,179	+ 151,299
Pernambuco	..	3,953	3,989	3,974	3,594	...	3,498	3,440	3,044	3,281	...	17	62,179	– 14,555

Companies issuing Monthly Statements only.

		1920. Nov.	Dec.	1921. Jan.	Feb.	Mar.	April	1921. Nov.	Dec.	1922. Jan.	Feb.	Mar.	April	Wks.	AGGREGATE. 1921-22.	+ or –.
		£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo		4,601	5,342	4,594	4,701	...	...	4,762	5,565	4,805	4,797	...	...	48	55,454	+ 3,216
Brazilian Trac. Mlrs		12199000	12600,000	12875000	11941000	13102000	...	14555000	15405000	15032000	14473000	15238000	...	13	44,743,000	+ 6,825,000
Brisbane		...	...	46.280	43.205	46,300	...	...	...	48.790	43,800	51,300	...	13	143,890	+ 8,105
British Columbia	$	858,842	917,668	908,385	838,682	867.083	...	877,335	940,113	907,242	821,828	849,680	...	39	7,771,665	+ 140,144
Buenos Ayres L'c'z		56,746	68.857	61,111	53,952	59,365	60.238	58.056	63,381	61.198	55,227	61,775	57.619	43	579,438	+ 8,486
Burma		53.696	50,481	50,035	48,405	50,931	...	58.271	54,194	59,362	52,380	60,296	...	34	463,423	+ 55,324
Cape Town ...		25.628	29,768	...	...	...	...	27.004	31,521	30,289	26.980	29,930	...	—	—	—
Carthagena & H. ...		2,714	5.560	3.877	2,839	2.226	2.329	1.717	3.237	3,075	2.773	2,145	2.991	17	10,984	– 287
Cordoba		19,122	19.299	18.696	18,600	21.717	...	22.698	22.641	22.152	21.918	25.382	...	52	277.368	+ 39.922
East India ...		4.234	4,271	4.299	3.819	4,168	...	3,945	4.058	4,080	3.737	4,446	...	34	33.017	– 410
Kalgoorlie... ...		2.969	3,140	2.418	*316	...	...	2,419	2,814	2.180	2.031	...	...	8	4.211	+ 1,747
La Plata		5.573	...	6.506	*728	*3.403	...	6,453	...	6.724	6.318	7,067	...	13	20,109	+ 9,471
Manila ...	$	320.345	315,599	321,449	306.389	298.317	...	306.850	316,467	309.252	310.001	284,576	...	13	903.829	– 22.255
Monte Video ...		43.846	...	50.863	48.119	48.925	46.189	47,426	...	32.634	48,111	51.158	47.960	26	279,419	– 7,458
Para		24.273	24,253	24.231	20,545	22,189	...	23.147	22.660	22,966	21,582	22,238	...	17	89,446	– 1,772
Port Elizabeth ...		6,620	8.185	...	...	...	...	6,828	8,344	8.120	6.690	7,851	...	—	—	—
Rangoon ...	Rs.	104,468	120,000	122.588	120,718	158.121	...	137.750	145.500	137,850	130,583	150,500	...	13	418.933	+ 17,536
Winnipeg ...	$	477,957	...	506.229	460,125	495.208	...	477,880	...	507,047	498.577	464,900	...	13	1,436,334	– 25,228

* Strike of Employees.

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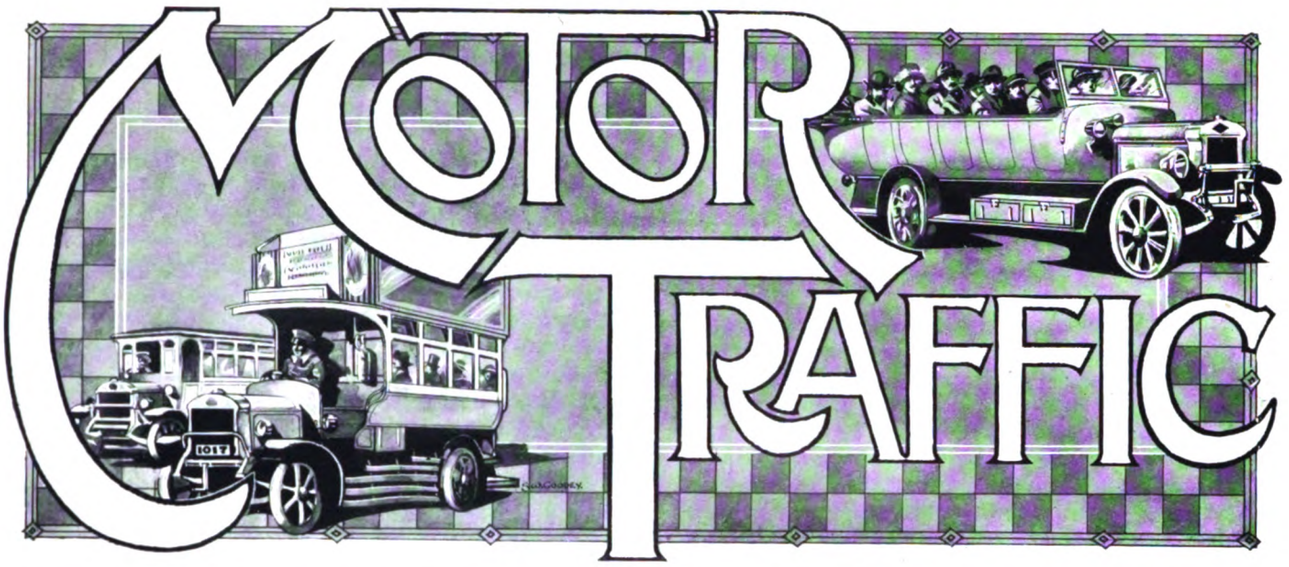

MOTOR TRAFFIC SECTION—SEVENTEENTH YEAR OF PUBLICATION.

MOTOR OMNIBUS RECEIPTS.

The opinion of the writer of this note has been recently asked in connection with a controversy centring round estimates presented in respect of a projected motor omnibus service. These estimates were the work of a highly qualified and experienced omnibus-operating engineer, and so far as his estimation of probable costs was concerned, there was no serious difference of opinion. His estimated costs totalled approximately fifteen pence a mile, this being for a service of between twenty and thirty omnibuses in a town where traffic and road conditions are not exceptional. There must, of course, be more element of speculation in the estimates of probable receipts, which in this case was put at about twenty-one pence per mile for thirty-seated vehicles of the single-deck type. This figure was based on the assumption, generally to be regarded as a reasonable one, that fares should average not less than a penny a mile per passenger, and that on the average the vehicles would be carrying seven-tenths of their full complement. The reason that this figure was contested was that the tramways in the same town were found to show a very much lower return per vehicle mile, and the argument put forward was that it was not safe to anticipate a higher revenue for the omnibuses.

On analysis, one cause of the low figure per vehicle mile for the tramway was found to be that two or three vehicles were habitually run as a train. These were crammed full during the rush hours, but during the rest of the day the whole train only carried a few people. It was presumably found less expensive to keep the trailer vehicles attached than to go to the trouble of detaching and again attaching them as and when required. It is not reasonable to estimate such a low average for the omnibus as for tramcars used in this way. For one thing, the power-station of a tramway system must remain in operation even if only a few cars are running, and therefore there may be a smaller loss resulting for maintaining a service at idle hours than from withdrawing it wholly or partially. This does not apply to the omnibus. Further, the omnibus will operate primarily on routes where for one reason or another tramcars are not permitted. These routes are generally in central and residential areas, where the best paying traffic is likely to be obtainable. Even where the two systems run in direct competition, experience goes to show that people prefer the omnibus to the tramcar on account apparently of its superior flexibility, which allows it to be stopped wherever the passenger desires. Yet a further point is that a tramway system tends to clog itself during the rush hours, reducing its working capacity just when the maximum capacity is most needed. This is due to the fact that in the central area various routes converge and use the same lines, with the result that the cars on one service impede those on another service. This is also true to some extent of omnibus services, but in this respect the greater flexibility of railless vehicles is undoubtedly of advantage where traffic is at all dense. Altogether it is in the majority of cases unjust to the omnibus to estimate the limit of its earning powers by direct comparison with the tramcar from the standpoint of the average number of passengers carried as compared with the total number for whom accommodation is provided.

HEAVY PNEUMATIC TYRED VEHICLES.

It seems that the law of the future is destined to serve as a definite encouragement of the use of pneumatic tyres on commercial and public service vehicles of moderate size. Overseas there is a growing tendency to make the use of pneumatics on motor omnibuses compulsory, though tests carefully conducted in this country have not indicated any marked advantage of the pneumatic in respect of comfort or of road wear, except on vehicles travelling at speeds considerably in excess of those possible for omnibuses working mainly in heavy traffic. It may, of course, be said that the pneumatic has not yet had a fair chance, inasmuch as it has merely been applied to vehicles built for use with solid tyres, and the presumably better protection afforded by it has not been utilised for the purpose of lightening the chassis or reducing the engine power and possibly the fuel consumption. It will only be when we are able to make definite comparisons of vehicles designed for smaller loads, but specifically

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MOTOR TRAFFIC

intended to be fitted with pneumatics and solid tyres respectively, that the question of the merits of the former can be definitely determined. It seems quite possible that for heavy loads at moderate speeds it would be found that the advantages of the pneumatic are not sufficient to justify its use. On the other hand, a law permitting higher speeds to pneumatic-tyred vehicles has the effect of allowing them a greater working capacity, and so giving them an opportunity of a reduction in costs per mile run, despite the undoubtedly heavier item of tyre maintenance.

THE LOCK-OUT AND OTHER MATTERS.

The commercial motor vehicle manufacturing industry has since the war been peculiarly unfortunate. It has shared with the engineering industry as a whole the dislocation occasioned time and again by labour troubles. No sooner has it got upon a footing permitting of reasonably economical production than some strike or lock-out intervenes which, even if the workers in the industry are not themselves involved, is almost as fatal in its effects. Examples are to be found in the moulders' strike, the railway strike, and the stoppage of the coal mines, and now we have the engineering lock-out, which has had the effect of practically closing most of the factories. It can, perhaps, be argued that, even if works were now in a position to turn out their full output, the demand is lacking, and the result would merely be an accumulation of stock. In some cases and to some extent this is true, but even when we are passing through the deepest trade depression the manufacturer is handicapped if he cannot give deliveries at agreed dates or produce new machines to the special requirements of his clients. The competition of surplus Government vehicles has, of course, had a disastrous effect, particularly on business in vans and lorries of normal types. It is mainly in respect of public service vehicles and specialised municipal vehicles that the standard War Department chassis is not applicable, and the manufacturer has some real opportunity of doing business with new products. It is stated that the Government has not renewed its agreement with the purchasers of Slough, but by this time the harm has been done, and it is difficult to see what method of disposal of the remaining vehicles can be adopted that will not be more or less equivalent in its effect on the manufacturing industry.

HOW DRIVERS CAN SAVE FUEL.

Mr. Walter Jackson, an American electric railway and motor omnibus consultant, who has frequently visited this country to familiarise himself with progress in local transport here, has recently contributed an article to the *Commercial Vehicle* of New York describing the methods of the Birmingham and Midland Omnibus Company in securing fuel economy. It was during the later years of the war and immediately thereafter, when the price of petrol was nearly three times the figure of 1915, that the fuel economy campaign was inaugurated and carried to a successful issue. The services were divided into three classes, viz., "A," good, flat roads; "B," good, flat roads with medium hills, and city roads with frequent stops; and "C," very hilly districts and narrow roads. The men were put on a bonus and super-bonus plan, namely, so much a day and so much more per week if each day of the week had been within the stated figure. The average for the system as a whole was set at 6 miles per gallon, using the Imperial gallon, the engines of the 200 Tilling-Stevens petrol-electric omnibuses being rated 45 H.P. Investigation showed that the worst waste was due to engines being left running when a vehicle was standing, either for traffic stops or at the termini. This loss was found to average one pint for every five minutes' standing time. Second was the question of the engine speed after throttling down. It was suggested that the adjustment screw should be set so that the engine would just tick over, and should be so fine that the engine would not run in the garage when cold without a piece of paper or similar insert between the stop and the lever.

Other suggestions were as follow—To obtain the best running, co-operation must be used between the throttle and the shunt control lever. The shunt lever should be kept forward whenever possible, without the engine knocking or labouring, the throttle being kept so closed that only just sufficient fuel gets through to provide the power. Black smoke from the exhaust when running or when throttled down is a sure sign that the carburetter is set too rich. Hesitation in getting away or choking is another indication. Clinking badly on hills when very hot is a sign of too weak a mixture, or that the ignition is advanced too much. Under normal conditions on give and take routes with the throttle just open and the shunt lever tight forward, the engine should run sweetly with a gentle hiss from the carburetter. The petrol consumed on a given trip depends upon the speed the engine runs at, and the number of charges of petrol which are burned. It is therefore obvious that the slower the engine runs the less fuel will be used. On long down grades a considerable saving can be made by switching the engine off, the vehicles free-wheeling as much as possible. Power should be shut off at a considerable distance before the stopping place is reached so that all the fuel given to the engine to set it in motion can be absorbed. No petrol should be allowed to drop from the carburetter or pipes. In their own interest the drivers were cautioned to see that the tanks were full before going out, and they were also asked to note the amount put into the tank upon returning from a run. Strict instructions were given that the vehicles should not be overloaded, since it caused enormous wear and tear as well as excessive fuel consumption.

The effectiveness of the campaign may be judged from the fact that despite ageing equipment and a poorer grade of fuel, the miles per gallon for the year 1920 had risen to 6·3, compared with 5·6 in the year 1915. That this was combined with high mechanical efficiency appears from the fact that during the early summer of 1921 the omnibuses were operated about 40,000 miles per breakdown. The average daily run of an active omnibus was 100 miles, and including the reserve vehicles, etc., 75 miles. The total mileage for 1920 was about 4,500,000, and covered nearly 200 routes up to a round trip of 252 miles. The usual annual mileage per omnibus is 30,000 miles, although

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MOTOR TRAFFIC

some go up to 45,000 miles. During the summer months and on Saturdays and Sundays throughout the year practically every vehicle is out earning money in either regular schedule or in private work. A general detail examination and replacement of worn parts is conducted quarterly. Mr. Jackson concludes that American omnibus companies could save a great deal of fuel and cut down materially on their operating expenses by adopting some such system as that followed by the Birmingham and Midland Company. The scheme, too, is worth the attention of managers of undertakings in this country. Notwithstanding the lack of wisdom shown by some trade unions in discouraging the bonus system, employees can soon be brought to appreciate the addition of a substantial sum to their wages. Moreover, they should be shown that unless they put the highest degree of efficiency into their work they are failing in duty to their employers and to the expensive machines entrusted to their care.

GUY MOTOR COACHES.

A new service of motor coaches is being organised by Messrs. Keith and Boyle, Limited (the London representatives of Guy Motors, Limited, of Wolverhampton), which will be known as the "Orange Motor Coaches." The regular routes to be covered embrace all the principal resorts on the South Coast, as well as Margate and Clacton on the East Coast, while half-day trips to Windsor, Maidenhead, Dorking, Tunbridge Wells, Guildford, etc., will be a special feature of the service. In each case the Victoria Embankment near Charing Cross is to be the starting point.

Messrs. Keith and Boyle claim to have evolved the most luxurious type of motor coach yet offered for such services. Close study of the motor coach traffic has convinced them that for successful development the moderate size vehicle that ensures reliability and comfort is essential. In the Guy 25 H.P. chassis, which by reason of its silent running and efficient springing is so well suited for passenger work, reliability for continuous service can be depended upon, while by limiting the seating capacity to 22 passengers, scope has been given to the designer of the body to introduce many refinements which would be found impossible in the old type 30-seater with which we were so familiar during the previous season. Apart from the colour of the coaches, a rich orange, the most striking features in the body work are the ample space both in the seats and between them, the division of the seats on the half bucket principle and the general excellence of the fittings and appointments. From our illustration a general view of the seating arrangements will be seen. Each seat is eighteen inches wide, while the centre gangway adds greatly to the convenience of passengers. The seats are upholstered in real leather, hair stuffed on spring frames, the floor being well carpeted. There are double entrances on the near side with single entrance on off side for the driver. These, as well as the steps, are of the omnibus type, thus rendering the body easy of access, the doors being mounted with three cranked hinges.

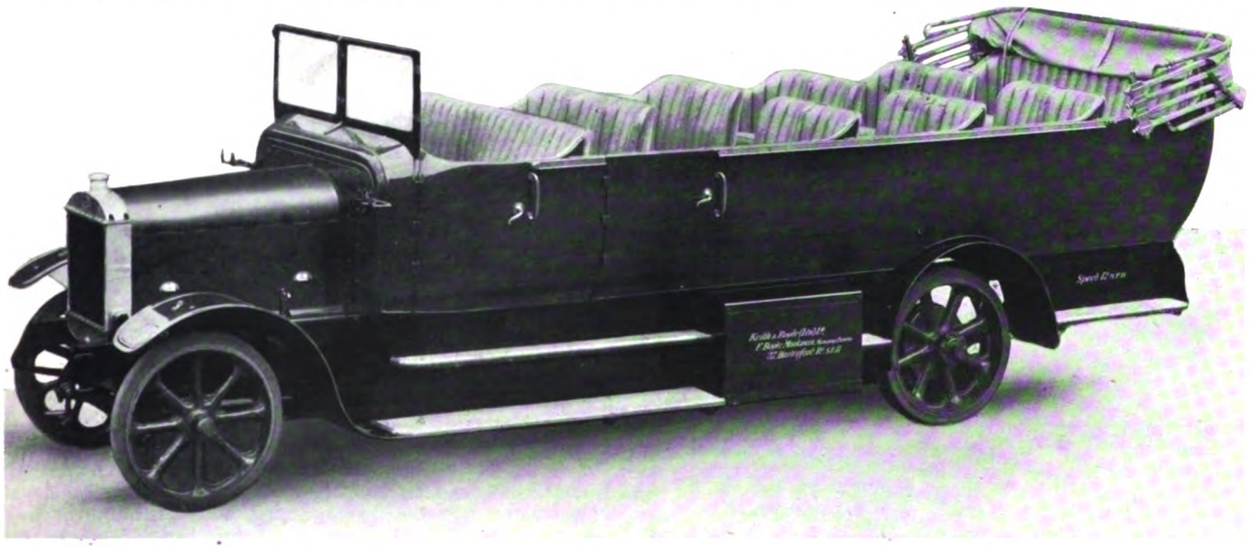
The hood is the special design of the body builders, Messrs. Harrington, Limited, of Brighton, and is of the sliding type mounted on roller bearings. Continuous channels are provided along which the hoop sticks slide to their respective positions, where they are locked. It is claimed that this hood can be set up or taken down within two minutes. It is so mounted and fitted that although there is very little overhang when down, it is housed well clear of the passengers occupying the rear seats.

The Guy 25 H.P. chassis, as will be seen from the following brief specification, has a number of special features. It is fitted with a four cylinder engine with bore and stroke of 4 in. and 5½ in. respectively. The valves are of the mushroom type, placed in the cylinder head, this being detachable and water cooled. The design of the cylinder head and valve arrangement is patented and has the distinct advantage of being easily removable without interfering with the waterpipes, tappets, exhaust, or inlet pipes. Another advantage of the detachable head is that in conjunction with the large inspection doors which are provided in the crank case the connecting rod big end bearings can be adjusted or removed and the piston and connecting rod entirely drawn out through the top of the cylinder without dismantling the engine. The high tension magneto is placed high up, and is readily accessible. A "Zenith" carburetter is fitted with gravity feed.

The gear box provides for four forward speeds, and is arranged for thin oil lubrication. The change speed gate and lever is attached directly to the gear box, thus obviating the risk of jamming through want of alignment.

The engine and gear box complete with all operating gear is carried on a sub-frame which is suspended from the main frame by three universal joints. This arrangement prevents the distortions of the main frame being transmitted to these vital parts. In practice it has been found that even with one wheel raised two feet the sub-frame remains in true alignment.

The back axle is of the double reduction bevel and spur wheel type, the bearings supporting the gears being on the ball and roller system. The weight of the vehicle is taken by the axle case and wheel tubes; any distortion therefore is not transmitted to the axle shafts, which only take the drive. Special attention has been paid to the design



A Guy Motor Coach.

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MOTOR TRAFFIC

of the brakes. The foot brake operates on the bevel pinion shaft on the back axle, so that none of the strain goes through the universal joints. A compression spring arrangement is provided in the brake operation gear, so that only a desired maximum pressure can be put on the brake. Both brakes have each half of the shoe compensated by a sliding cam to ensure equal application all round.

The springs are designed with a special clip, which registers with the spring pads on the axles instead of the usual practice of drilling and fitting with a dowel peg. The rear springs are underslung, which not only permits of a lower loading line, but gives better springing to the vehicle and longer life to the tyres.

Dunlop solid tyres are fitted (single on the front wheels and twin on the rear) and these give all the comfort desired, so satisfactory has the springing of the chassis been found in practice.

MIDGLEY-SCHOLEY LIGHTING AND STARTING.

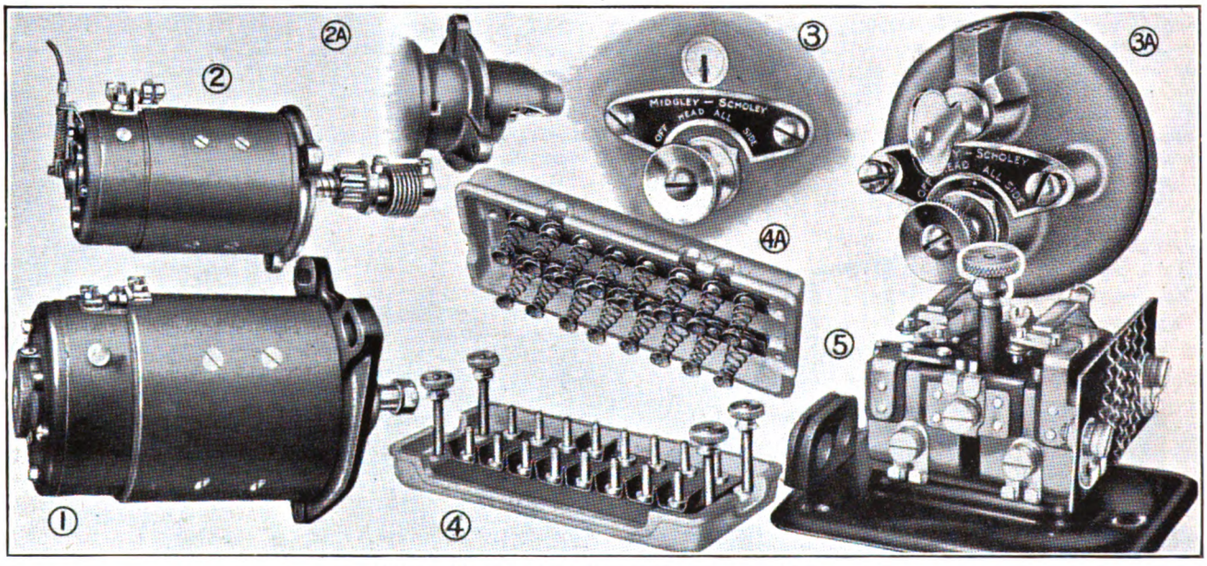
A System Possessing New Features of Proved Utility.

That improvements on existing methods of electrical lighting and starting of automobiles were needed has been evident during the past few years. Notable advances are comprised in the Midgley-Scholey system in which, it is claimed, many fundamental faults are eliminated. Designed by Mr. A. H. Midgley, the apparatus shows a marked advance on existing lighting and starting equipments. The inventor was a pioneer in designing equipments of this description, and has become the foremost authority on the subject. Under these circumstances it is not surprising to learn that Messrs. Scholey and Company, Limited, have undertaken the manufacture of the apparatus at their Croydon Works, where they have had wide experience in small motors and dynamos. The originality of Mr. Midgley's inventions is attested by the fact that among the features of the Midgley-Scholey system covered by patent applications in all the principal manufacturing countries are the following—The method of regulation of the dynamo; the automatic control of dynamo output to prevent overcharging of the battery; operation of the starter by means of a Bowden wire or other device from the switchboard; combination of the switchboard for controlling and locking the starting, lighting, and ignition circuits; construction of the junction box, having spring-held connections; construction of pole pieces and other parts of the dynamo and starter in order to simplify manufacture.

Full details of the features of the system are set forth in a brochure, which can be obtained on application to Messrs. Scholey, of 56 Victoria Street, S.W.1. From that publication it will be seen that vital improvements have been effected in the dynamo, and that the form of controller and cut-out used in conjunction with it has an important bearing on battery upkeep. The starter, switchboard and junction box, while showing great originality in design, achieve success because they mark a definite stage in the practical application of lighting and starting.

Midgley-Scholey dynamos are made in four sizes, ranging from 3½ ins. to 5 ins. diameter of yoke, and are suitable for saddle or flange mounting, with or without ignition. The design gives good regulation over a wide range of speed. Battery charging is by the constant current system, the only method suitable for charging under all conditions, as the dynamo voltage follows the battery voltage, and in the case of sulphation it will rise until it is sufficiently high to break it down and charge the battery. With existing constant current systems there is danger of overcharging, with consequent loss of acid and damage to the battery. Instructions are often given to switch off the dynamo when the voltmeter shows 15 to 16 volts. This is not always done, especially in the case of commercial vehicles, and on the majority of equipments now supplied no voltmeter is provided, so that one does not know the condition of the battery until it fails.

The drawbacks are overcome by the Midgley-Scholey apparatus, which is provided with a very neat form of controller incorporated with the automatic cut-out. The controller does not remain out of action until the battery is discharged, but each time the speed of the dynamo falls below its minimum generating speed (which is usually about 7 miles per hour), it is then accelerated and the full output is given for a few seconds until the battery voltage rises, when the output is reduced. The automatic-cut out disconnects the dynamo from the battery upon the speed falling below the minimum generating speed, and thereby prevents the battery discharging through the dynamo. When the speed rises sufficiently to charge the battery, the cut-out connects the dynamo to the battery. It is claimed that the Midgley-Scholey system is the only one which properly takes care of the battery under all conditions.



Midgley-Scholey Lighting and Starting System.

1—Dynamo; 2—Starter; 3 and 3a—Switchboard; 4 and 4a—Junction Box, with spiral springs holding cables firmly; 5—Automatic Controller combined with cutter, providing against overcharging batteries.

The Midgley-Scholey switchboard eliminates the complication of several switches. A neat aluminium junction box is provided, which is usually fitted to the side member of the chassis in a convenient position, instead of in the inconvenient position at the back of the instrument board. The wiring and connections are the same for the small car and the large car, provision being made in the junction box for additions such as horn, dash lamp, interior lighting, dimmer or ammeter, so that, no matter whether it is originally installed on an 8 H.P. chassis or on a 40 H.P. chassis, the system is complete, yet allows for additional fittings without the necessity of installing special junction boxes. These features are unique.

As only one system of wiring and connections is employed between the various units, the whole of the wiring up to the junction box can be made a permanent feature of the chassis. In the case where it is necessary to remove the switchboard for the fitting of a body, all that requires to be done is to take off the cover of the junction box and lift the switchboard cable off its respective studs, and disconnect the Bowden wire from the starter.

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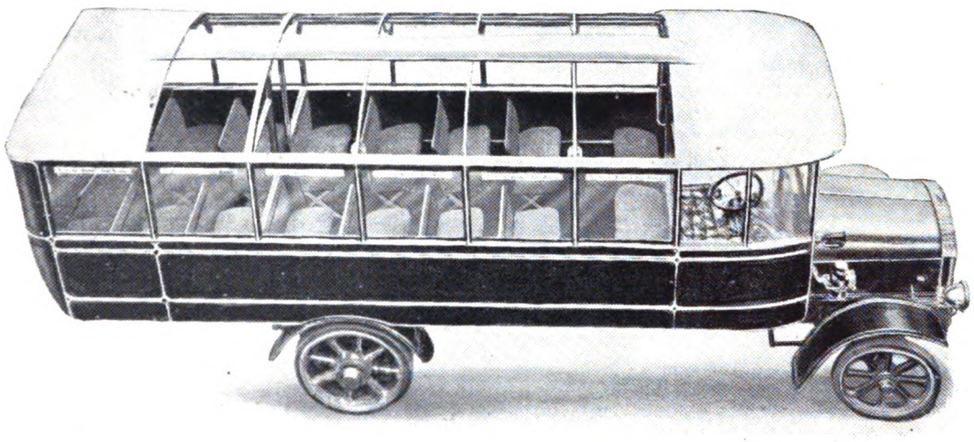
MOTOR TRAFFIC

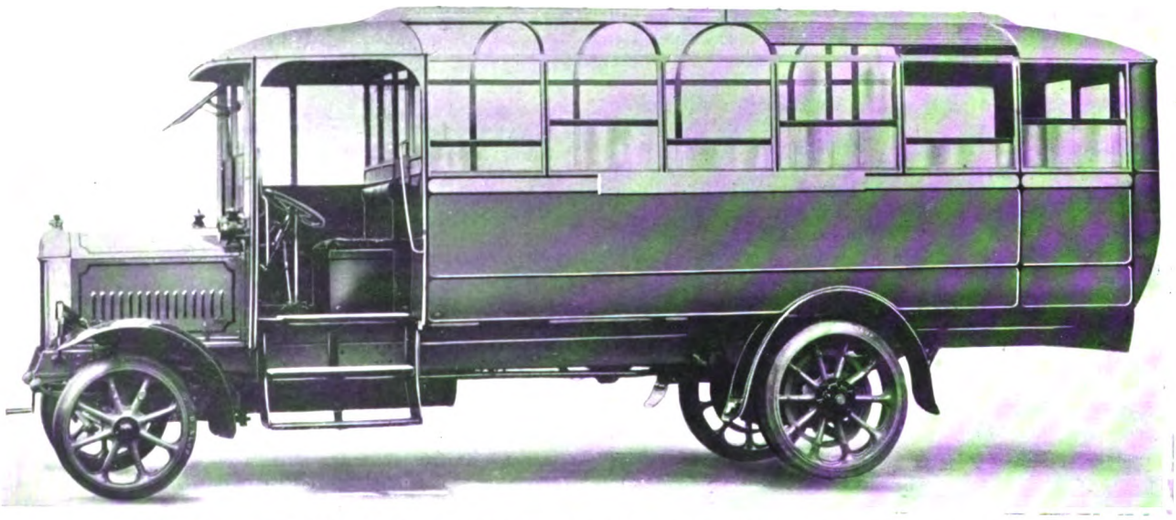
AN ALL-WEATHER MOTOR COACH.

At the invitation of Messrs. Strachan and Brown, of Holland Gate, High Street, Kensington, our representative recently had an opportunity of inspecting the new roll roof which in conjunction with an improved type of balanced drop windows enables a closed omnibus to be quickly converted into an open coach and *vice-versa*. The great advantage of this system is the fact that the change can be effected in a few moments and without stopping the vehicle, so that should the coach be running as an open vehicle and be suddenly overtaken by a rain storm, the passengers themselves can immediately draw the roof blinds and pull up the windows, and so convert it into a closed omnibus. The principle upon which the roof sections are operated is that made familiar by the roll-top desk. Flexible wooden blinds of small section slats are mounted upon a stout waterproof cloth which is attached to a spring roller. These rollers are housed in a shallow box which runs longitudinally down the centre of the roof, the covers being mounted in pairs. The hoop sticks carrying the covers are of a special section, and are so constructed that they not only serve as guides for the rolling cover, but effectually prevent the admission of water to the interior. The width of the face of these sticks is sufficient to give ample bearing surface for the cover on each side, a groove to take any water that may find its way in from the edge of the roller, and a raised portion in the centre to which is attached a metal strip which completes the slot in which the rolling cover runs. Although the hoopsticks are less than one inch in thickness, owing to the method of reinforcement employed they are of ample strength. To close the roof each section of the cover is drawn from its housing and fastened to the cant rail by means of a special clip fastening which ensures a tight fit, thus eliminating the possibility of rattle or the admission of water. A shallow gutter runs the length of the vehicle along the cant rail, and from this the water is led to the ground. The whole of the roof device, for which patents are pending, is extremely neat, and when operated by our representative worked with remarkable ease. The tension on the spring is sufficient to retain each section of the cover in its housing without any kind of fastening, so that it is always free to be drawn when required. The inside of the cover shows the slats polished in their natural colour, and gives a most pleasing effect; the exterior is painted white to conform with the fixed portion of the roof over the driver's seat and the rear of the vehicle. The cover of the longitudinal box or housing is so shaped that while it affords sufficient space for the free working of the rollers, it is hardly noticeable when the roof is closed. A noteworthy point in this form of roof is the ample ventilation which it provides even when the doors and windows are all closed.



Strachan and Brown's All-weather Coach with Canopy Top Open.

As will be seen from our illustrations, in one of which all the sections are shown open, the roof is arranged in three double sections, two covering the main compartment of the vehicle and one the rear, or smoking compartment. As the working of each section is entirely independent of its fellows, it will be seen that while the main compartment may be required to be covered, the smoking compartment can be open at the will of the passengers.



Side View of Coach, showing Canopy Top and Windows Partly Closed and Partly Open.

The improved type of silent and balanced drop windows with which the vehicle shown is fitted completes the Strachan and Brown scheme of the all-the-year-round coach. In this the retaining mechanism has been considerably improved by the use of a new type of gearing. It is claimed for this that any window so fitted

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is rattle-proof, and can be adjusted at any height ; further, that vibration merely tends to tighten the window.

An important point in connection with both the roller roof and the improved type of window is that they can be fitted to any existing vehicle. The vehicle shown in the illustration can be taken as a fair example of the excellent body work for which Messrs. Strachan and Brown are noted. It is arranged to seat 33 passengers, and is partitioned to form a smoking compartment at the rear, to which there is an emergency door. Extra seating accommodation can, however, be obtained by the fitting of a new type gangway seat, which is supplied with a comfortable spring cushion and back-rest strap. This has recently been introduced by Messrs. Strachan and Brown, and is so mounted that it swings under one of the adjacent seats when not in use, where it is firmly held in position clear of obstruction.

L.G.O.C. COACH TOURS.

Mr. G. J. Shave and the Pneumatic Tyre.

A programme even more varied and extensive than those of previous years has been prepared by the London General Omnibus Company for this season's motor coach tours in the Home Counties. During the last couple of years these tours, organised as they are on excellent lines and conducted with the most up-to-date and comfortable vehicles, have become a distinct feature of the round of amusements provided for the choice of Londoners and visitors to the city. Each week in the coming season there will be 40 different trips, long and short, from which the holidaymaker may select, according to his taste and purse. In the first place there are eight conducted whole-day tours of from 70 to 90 miles in length. Each will start from St. James's Park Station at about 10 a.m., and the party will arrive back in town in time for dinner and the theatre. These day tours comprise runs to Guildford and Hindhead, Maidstone and Rochester, Windsor and Burnham Beeches, Tunbridge Wells and Farningham, Guildford and Virginia Water, Penshurst and Godstone, Maidenhead, Windsor and Hampton Court. The last-named, "The River Tour," includes a trip by launch from Boulter's Lock to Windsor. Experienced guides accompany these tours, and indicate places of particular interest. It is noteworthy that for an inclusive booking fee of one guinea, table d'hote luncheon and tea at first-class hotels are provided *en route*.

There are also 19 half-day tours of from 50 to 60 miles in the country, starting at 2 p.m. Some of these run from central London and others from various suburban centres. A halt is made for tea and a ramble round some place of especial interest. Other features of the General Omnibus Company's summer programme include three-hour evening tours, and "Seeing London" excursions.

For the convenience of patrons a number of suburban booking offices have been established.

On Saturday, May 6, a party of London pressmen were invited to make an inaugural trip on the Tunbridge Wells and Farningham route. The weather was ideal, and the outing proved in every way thoroughly enjoyable and successful. A new type of coach was used, with comfortable "armchair" seats, and with a folding hood which rests above the dashboard, instead of at the rear, when not in commission. The vehicle, which ran with marked smoothness, had but one entrance door, and the seating was so arranged that the occupants could move freely from front to rear. During luncheon at the Spa Hotel, Tunbridge Wells, Mr. G. J. Shave, chief engineer and operating manager of the company, in welcoming the guests, mentioned that when these tours were started in 1920, the programme comprised 20 trips weekly, whereas for the present season 62 per week were being arranged. Four new 20-seater coaches *de luxe* were nearly completed, with pneumatic tyres. With regard to this class of tyre, the company were proceeding with experiments very carefully. Some giant pneumatics had served extremely well, giving a mileage of 12,000 on a complete set. The pneumatic tyre was, however, not yet ready for adoption on heavy public service vehicles, and more use was likely to be made of the cushion tyre, with which, he was sorry to say, British manufacturers did not seem anxious to get busy.

The return journey was made through many of the Kentish hop fields and a delightful countryside, tea being served at Farningham. Mr. S. J. Webb (chief passenger agent), Mr. J. H. Richardson (press agent) and his assistant, Mr. B. C. Foxcroft, accompanied the party.

Messrs. Leo Swain and Company, Limited, 237 Deansgate, Manchester, are placing agencies for the Luchard air compressor plants, and anyone desirous of taking up this agency should communicate with them.

RULE OF THE FOOTPATH.

Progress of the Proposal to Keep to the Left.

The London Safety First Council on April 7 decided to ask the municipal authorities in Greater London to take concerted action to bring into force on July 1 next a change in the rule of the footpath, whereby pedestrians would be required to walk on the left instead of on the right of the footpath.

The chairman (Sir Edward Smith, London County Council) said they had every hope that this action, necessary to abolish the dangerous method of walking on the pavement edge in the same direction as the road traffic, would be actually taken, for the Safety First Council's campaign had so far succeeded that the Ministry of Transport had given it their blessing, and the general body of municipal authorities were in favour of the change. He regretted, however, that the City of London authorities were opposed to it. There was no place in the world, he thought, where the reversing of the rule would be of greater benefit.

Mr. H. E. Blain, hon. secretary, reported that the Commissioner of Metropolitan Police had intimated it was not the intention of the metropolitan police to oppose the change. With the exception of the City of London police the authorities generally were, he claimed, in favour of it. Many provincial cities had now definitely adopted the rule of the left.

The Director General of Roads has asked local authorities throughout the country to consider the adoption of a "keep to the left" rule for pedestrians.

After hearing a deputation from the Tramways Committee, the Glasgow Magistrates Committee have adopted the new rule, and have directed that the attention of the public be drawn to it by the affixing of notices on lamp-posts and in the tramway cars. Megaphones are also in use on some of the cars to call upon pedestrians to "keep to the left."

Birmingham Watch Committee on April 5 considered a letter from the Tramways Committee in favour of altering the rule of the footpath. The chief constable reported that the newly-formed Safety First Council were taking steps to educate the public, and were approaching the Education Committee on the matter.

LONDON OMNIBUS EFFICIENCY.

Address by the Operating Manager.

A great deal of interesting information concerning the mechanical efficiency of the vehicles of the London General Omnibus Company was given by Mr. G. J. Shave, the operating manager and chief engineer, in an address on April 14 to the City of London Tradesmen's Club. Mr. Shave dealt at length with the operations of the new overhaul works at Chiswick, an illustrated description of which has appeared in these pages.

Enterprise, under conditions none too favourable, he said, had erected the Chiswick works, but efficiency hitherto unattainable would be the result. In 1921, before the opening of the works, a high standard had been reached. In that year the lost mileage due to breakdowns was only three miles in 10,000. An especially valuable department was that devoted to experiments and research. Special engine tests were made, and the relative value of carburetters, magnetos, and lubricants were ascertained. Attention was also paid to finding new fuels and fuel-saving devices.

Replying to questions, Mr. Shave stated that it was impossible to widen the cross seats of the new vehicles, as the width of the omnibus was restricted to 7 ft. 2 in. by the licensing regulations, although any other vehicle not a public vehicle could have a width of 7 ft. 6 in. The company had not yet succeeded in obtaining an amendment of the regulation. In order to lessen vibration they were experimenting with a cushion tyre. Roof coverings had also been tried. The open top was best for seeing London, and taking an average of three years before last year's abnormal dry season it was found that there was rain during only 4 per cent. of the hours of running.

"T.B.R." Guide.—The issue of this popular guide for May 1922 (Messrs. Rieu, Wiley and Company, 123 Pall Mall, S.W.1), contains particulars of a number of additional services. The compilation is extremely useful, and we are surprised that tramway managers do not more generally arrange for the inclusion in it of their services in greater detail. The number for May contains also a list of motor coach services arranged alphabetically under the starting point. Each service is given a separate paragraph, starting with the name of the firm supplying the service and the chief address for booking.

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REGULATION OF ROAD VEHICLES.

REPORT OF THE DEPARTMENTAL COMMITTEE.

The second interim report of the Departmental Committee on the Taxation and Regulation of Road Vehicles was issued on April 13 by the Ministry of Transport. Taxation and revenue were dealt with in the first interim report, which was issued on March 31, 1920. The committee was constituted as follows—Sir Henry Maybury, Director-General of Roads, Ministry of Transport (chairman); Sir George Beharrel, Director-General of Finance and Statistics, Ministry of Transport; Sir Thomas Berridge, Royal Automobile Club; Sir Harcourt E. Clare, Local Authorities; Mr. Stenson Cooke, Automobile Association and Motor Union; Mr. F. L. D. Elliott, Police Authorities; Mr. W. Rees Jeffreys, Society of Motor Manufacturers and Traders; Sir Philip Nash, Director-General of Traffic, Ministry of Transport; Mr. W. H. Pascoe, Board of Customs and Excise; Mr. F. Pick, London and Provincial Omnibus Owners' Association; Mr. E. S. Shrapnell-Smith, Commercial Motor Users' Association; Mr. C. W. Tindall, Agriculture; and Mr. E. Twentyman, Treasury.

The report extends to 77 pages. Forty-four witnesses were heard. They were representative of the motor organisations and manufacturers, tyre manufacturers, steam wagon makers, County and Urban Rural Councils, London and Provincial Omnibus Owners' Association, London General Omnibus Company, Metropolitan, North Riding, Kent, Lincolnshire, and Manchester Police, National Transport Workers' Federation, County Surveyors' Society, etc.

CLASSIFICATION, CONSTRUCTION, ETC.

The Committee state that their object has been to provide for the utmost possible freedom for progress in the construction and use of motor vehicles consistent with the public safety and the wear and tear of the roads. They suggest that the time has arrived for a more convenient classification of mechanically-propelled vehicles, and they put forward a system of classification consisting of the following groups—(1) Locomotives—(*a*) heavy, (*b*) light; (2) heavy motor cars, including tractors; (3) agricultural tractors; (4) motor cars; (5) motor cycles; (6) exceptional vehicles. The Committee deal with construction, design, weight, etc., with an additional section on trailers, and make recommendations as regards testing of axle weights, efficiency and police examination of brakes, ploughing engines, and road rollers. A general recommendation is that the Minister of Transport should have wide powers to vary the regulations in the light of future experience and progress in construction, that he should be empowered to authorise the use for experimental purposes of special vehicles which do not comply with the general recommendations, and that he should have power to make regulations for special classes of vehicles.

NO FIXED SPEED LIMIT FOR CARS.

With regard to the suggestion that a higher limit should be imposed, the Committee report that "no reasonable fixed limit can be a suitable speed for motor cars on all roads and under all conditions, and it would be impossible to define the roads upon which any fixed maximum speed should be permitted. The Committee have come to the conclusion that the maximum speed limit should be abolished, and that the public would be more effectively protected, and less irritation caused to the motorist, by the rigid enforcement of the regulations as to dangerous driving.

In regard to dangerous driving, they suggest that the present statutory provisions should be made applicable to all mechanically-propelled vehicles and the penalties increased. The penalties suggested are as follow—

First Offence.—Fine not exceeding £50, with power to the Court to suspend the driver's licence and/or disqualify him from holding one for such period as they may think fit.

Second or Subsequent Offence. Compulsory suspension of licence and disqualification from holding one for such period as the Court may think fit, unless for reasons to be stated the Court shall specifically determine otherwise, together with a fine not exceeding £100, and/or imprisonment for a period not exceeding six months.

SPEEDS FOR HEAVY VEHICLES.

In the case of heavy motor cars, locomotives, etc., the Committee consider it essential that there should be some restriction of speed in view of the fact that the speed of such vehicles is a serious factor in relation to road damage, and damage to property by vibration. The speeds suggested are set out in the following table—

I.—HEAVY MOTOR CAR FITTED WITH PNEUMATIC TYRES.

Reg. Unladen Weight.	*Max. Axle Weight on any One Axle.*	*Max. Speed.*
Not ex. 3 tons 15 cwt.	Not exceeding 4 tons.	20 miles per hour.

II.—HEAVY MOTOR CAR FITTED WITH TYRES OF A SOFT OR ELASTIC MATERIAL, INCLUDING PNEUMATIC.

Reg. Unladen Weight.	*Max. Axle Weight on any One Axle.*	*Max. Speed.*
Not ex. 5½ tons ...	6½ tons	16 miles per hour.
Ex. 5½ tons but not ex. 7¼ tons ...	8 tons	12 miles per hour.
	10 tons	8 miles per hour.

III.—HEAVY MOTOR CAR WITH TRAILER, BOTH FITTED WITH PNEUMATIC TYRES.

Unladen Weight of Trailer.	*Maximum Speed.*
Not exceeding 40 cwt.	* 16 miles per hour
Exceeding 40 cwt.	* 8 miles per hour.

IV.—HEAVY MOTOR CAR FITTED WITH PNEUMATIC TYRES OR TYRES OF A SOFT OR ELASTIC MATERIAL, WITH TRAILER FITTED WITH TYRES OF A SOFT OR ELASTIC MATERIAL OTHER THAN PNEUMATIC.

Unladen Weight of Trailer.	*Maximum Speed.*
Not exceeding 40 cwt.	* 12 miles per hour.
Exceeding 40 cwt.	* 8 miles per hour.

V.—HEAVY MOTOR CAR FITTED WITH NON-ELASTIC TYRES, WITH OR WITHOUT TRAILERS, OR ANY HEAVY MOTOR CAR DRAWING A TRAILER FITTED WITH NON-ELASTIC TYRES.

Maximum speed, 5 miles per hour.

As regards reduced speed limits in populous areas, "they consider that the duty of suitably varying from time to time the speed at which a vehicle is proceeding so that it may do so with safety, must of necessity rest with the driver, who must assume full responsibility for driving in such a manner as will not endanger any other vehicle or person upon the highway." They suggest that the case would be met by the institution of standard forms of cautionary signs to be prescribed by the Minister.

DRIVERS' FITNESS AND KNOWLEDGE. RULES OF THE ROAD.

The Committee express the opinion that "the institution of tests of mechanical knowledge or of physical fitness before the issue of motor drivers' licences is not justified owing to the practical difficulties, quite apart from the very heavy expenditure which any such proposals would involve." They recommend, however, that every applicant for a driving licence should be required to make a declaration on the form of application that to the best of his knowledge he is not suffering from any disease or physical disability which would be likely to cause the driving of a mechanically-propelled road vehicle by him to be a source of danger to the public. They do not recommend any alteration of the minimum age limit.

The essential signals indicating the intention to stop and the intention to turn to the right, in the opinion of the Committee, should be made compulsory. The signals recommended by the Advisory Committee on London Traffic for slowing down, turning to the left, and inviting to overtake should be encouraged in every way. As regards rules of the road, the Committee think it would be unwise to lay down a series of regulations enforceable by penalties, but suggest that the existing law should be modernised, and that a statement of the rules and courtesies of the road should be printed on every driving licence.

On the subject of the left-hand drive, they consider that there is no evidence which would justify the prohibition or restriction of the use of such cars, though they consider it essential that the driver should be able to give the proper traffic signals.

MIRRORS, LIFE-GUARDS AND SPLASH-GUARDS.

Other recommendations deal with the above-mentioned subjects in the following terms—

Where a vehicle is so constructed or used as to prevent the driver from observing or hearing readily vehicles overtaking him, it should be provided with a suitable reflecting mirror or sound receiver and transmitter, unless there is a man travelling on the rear of the vehicle or of any trailer or trailers drawn thereby with a suitable means of communicating with the driver.

All vehicles which are now, or at any time shall be, permitted to travel at speeds of 12 miles per hour and over, and which are not fitted with running boards or the equivalent, should be constructed or fitted with guard rails in such a manner as effectively to guard

* In no event shall the speed be greater than the legal maximum for the heavy motor car if used without a trailer.

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the space between the front and rear wheels. The question of the provision of guards in front of vehicles should be reconsidered as soon as satisfactory devices appear to be available.

All developments in the invention of mud splash-guards should be watched carefully with a view to the reconsideration of the question of their compulsory use when satisfactory appliances have been devised.

EXPERIMENTS, GAS AND EXTRAORDINARY TRAFFIC.

In order to secure reliable data as to the actual effect on roads of the different types of vehicles travelling at various speeds, the Minister of Transport, the Committee advise, should be empowered to construct road lengths and build or subsidise vehicles for experimental purposes, and to arrange trials of vehicles which do not comply with the regulations.

It is suggested that the Minister of Transport should be empowered to make regulations requiring the use of efficient spark arresters, and that the use of compressed gas as a means of traction should be allowed only under a special licence.

With regard to extraordinary traffic it is recommended that an agreement should be made between the parties for strengthening a road to carry the extra traffic before it begins.

PROSECUTIONS AND PENALTIES.

In view of the recommendations that the speed limit should be abolished, the Committee regard it as essential that the rear identification plate should be clearly and legibly illuminated at night. It is suggested that the Minister should be empowered to inquire into accidents where either the nature of the road or defect in the vehicle is alleged as a cause, and where accidents result in serious injury or loss of life.

The following recommendations are made on the question of prosecutions—(1) In all speed limit prosecutions two witnesses shall be necessary for conviction. (2) Notice of intention to prosecute should be given with the least possible delay. (3) It should be the duty of owners to assist in tracing drivers who have committed offences. (4) If the speed limit is abolished, the penalties for dangerous driving should be increased. In the case of persons who apply for licences or drive cars while their licence is suspended, the Committee recommend that the maximum penalty, even upon a first offence, should be imprisonment for a period not exceeding twelve months without the option of a fine, and that the court should be given discretion as to the imposition of hard labour.

The Committee recommend that the existing law in respect of mechanically-propelled vehicles should be simplified and consolidated, that English and Scottish locomotive law should be unified, and that as far as possible local by-laws and regulations which are a departure from the general law should be discouraged.

MOTOR TAXATION RETURNS.

A return issued by the Ministry of Transport shows that the total receipts from motor taxation from December 1 last to February 28 was £7,756,654. During this period the aggregate total number of licences issued was 669,530, of which 574,490 were annual and 95,040 were quarterly. The following is an analysis of the principal returns—

	No. of Licences.	Tax Receipts.
Cars taxed on horse-power	214,529	£3,406,032
Motor-cycles	217,427	553,927
Commercial vehicles	131,866	2,440,290
Road locomotives, etc.	1,501	34,074
Motor tractors, etc.	1,096	14,543
Motor hackneys	60,382	1,034,885
Tramcars	13,259	9,943
General identification marks	7,968	58,546
Horse-drawn (private and hackney)	176,039	137,707
Miscellaneous receipts	—	63,660

TILLING-STEVENS MOTORS, LTD.

The directors of Tilling-Stevens Motors, Limited, in their report for the year ended December 31 last, state that the result of the year's working is a loss of £148,212, to which must be added the debit balance brought in of £18,170, leaving to the debit of profit and loss account £166,382. The Board regret the loss, but they remind the shareholders of the abnormal trade conditions which prevailed throughout the whole of the year. In addition, the stocks in hand at December 31, 1921, taken at market prices, were considerably lower than the actual costs.

MOTOR VEHICLES FOR MUNICIPALITIES.

WORTHING ELECTRICITY COMMITTEE have in view the purchase of an electric vehicle.

SYDNEY (N.S.W.) COUNCIL propose to purchase a pneumatic pressure street flusher.

BATH CITY COUNCIL have decided to purchase a 1-ton truck for the electricity department.

BURNLEY HEALTH COMMITTEE have invited tenders for the supply of a new chassis for the ambulance.

AUDENSHAW URBAN COUNCIL have purchased a tipping wagon for the collection of house refuse.

WARRINGTON CORPORATION are arranging to provide the Medical Officer of Health with a four-seater motor car.

BOLTON CORPORATION have authorised the purchase of a car, with all-weather body, for the waterworks department.

HULL FINANCE COMMITTEE have sanctioned a proposal of the Watch Committee to purchase a new motor fire engine.

RIPON CITY COUNCIL are considering the question of purchasing a motor tipping wagon for the general use of the highways and sanitary departments.

BOURNEMOUTH HIGHWAYS COMMITTEE suggest an allowance of £150 per annum to the Borough Engineer for the provision and upkeep of a motor car.

MARYLEBONE HIGHWAYS COMMITTEE recommend the purchase from Straker-Squire, Limited, of a new chassis for £850, and a reconditioned chassis for £370.

BLACKPOOL HEALTH COMMITTEE have asked their chairman and the medical officer to report on a proposal to purchase four motor conveyances for the health department.

KENDAL CORPORATION, who for some time have been considering the question of motor traction, have asked a deputation to visit localities where refuse is removed by motor transport and to inspect the types of vehicles in use.

CALCUTTA MUNICIPAL COUNCIL, who had decided to purchase two motor fire engines, have now arranged to postpone the purchase of one "until the Act is amended." The Council have also reduced the provision of 15,000 rupees for the purchase of a 2-ton lorry to 10,000 rupees.

BIRMINGHAM CORPORATION are considering the provision for their veterinary department of a light motor car at a cost not exceeding £300. They believe that this would be more economical and speedier than the present arrangement by which two cabs and a four-wheeled trap are used.

GLASGOW WATCH COMMITTEE have had a letter from John Morris and Sons, Manchester, notifying that the firm have an improved type of turntable fire escape under construction, and inviting the committee to see it. The committee have asked a sub-committee to inspect the new machine, and also the escapes offered by two firms in London.

TRAFFIC ON LANCASHIRE ROADS.

The County Surveyor of Lancashire has drawn attention to the fact that, in spite of trade depression, there has been a considerable increase in mechanically-propelled vehicles using the main roads during the past year, and this would probably be further increased when trade again becomes normal. Further, it seemed to be the generally accepted opinion that the Ministry of Transport would shortly recommend a substantial increase of the present legal weights and speeds, both for commercial vehicles and motor omnibuses, which would add materially to the cost of road maintenance.

Several new omnibus services had been started during the year, and these were being added to almost every month. In consequence, greater lengths of main roads were in urgent need of immediate re-surfacing with some class of material other than ordinary macadam. The greater portion of the Liverpool and Manchester Road had been surfaced with tar macadam during the past ten years, but the increase in the number of heavy mechanically-propelled commercial vehicles using this road has been so extraordinary during the past three years that the surveyor is of opinion a still more expensive form of surfacing is required.

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OMNIBUS SERVICES.

BRISTOL.—At the annual meeting of the Bristol Tramways and Carriage Company, Limited, Mr. Samuel White (chairman) stated that the company had reconstituted their fleet of omnibuses running from Bristol into the country. They went 70 miles away from Bristol, and the routes totalled something like 700 miles. That meant that they were looking after the western district. They regarded themselves as the people to work those services with public vehicles on the main roads in the whole of that territory. Their policy was not to go further at present, but in regard to whatever services were called for in that area—fresh routes or additional vehicles—they regarded themselves as the firm to supply the natural demand.

CHESTER-LE-STREET.—A deputation of omnibus drivers employed by the Northern General Transport Company has asked the Urban Council to restrict the number of licences issued to competing services, as competition had resulted in the company reducing the number of drivers.

GLASGOW.—The City Council have asked the Tramways Extension Committee to consider a petition requesting the Corporation, owing to the stoppage of the subway, to run motor omnibuses from Patrick Cross to Pointhouse for the benefit of workmen.

HUDDERSFIELD.—Huddersfield Corporation opened an omnibus service from Honley to Holmfirth and Holmebridge on April 15 when the members of the Tramways Committee, Mr. A. A. Blackburn, the general manager, and members of the staff travelled by the new service to Holmfirth. There they were joined by the chairman and members of Holmfirth Urban Council. Councillor Tinker, in welcoming the representatives from Huddersfield, said that they were inaugurating a service which was bound to be a benefit to both communities. The vehicles were supplied by Karrier Motors, Limited, of Huddersfield.

KEIGHLEY.—Reporting on the result of running three hired omnibuses on certain routes in order to improve the service, the chairman of the Tramways Committee has stated that during three months there had been a loss of about 2d. per mile owing to bad weather. The Tramways Committee have decided to purchase two of the vehicles at £1,575 each.

MACCLESFIELD.—The British Automobile Traction Company have inaugurated new services to Buxton, Glossop, Prestbury, Stockport, and Wilmslow.

RIPON.—The United Automobile Services, Limited, have offered to provide omnibus services between Ripon and neighbouring towns if the sum of £2,500 is subscribed. The amount promised at the end of April had reached nearly £2,000.

SOUTHPORT.—A sub-committee of the Tramways Committee report that it is undesirable to substitute omnibuses for the tramway service, owing to the heavy expenditure required for omnibuses, the extra capital and maintenance cost on the roads as compared with the present maintenance of the tramway track, and the loss to the electricity undertaking in revenue. There were no districts in the borough, they added, where it would at present pay to run omnibuses as an adjunct to the tramways.

WARRINGTON.—The Corporation Tramways Committee received a letter from the Lancashire United Tramways, Limited, requesting them to reduce the sum of 1½d. per passenger payable by the company in respect of the running of their omnibus service between Irlam and Warrington, in so far as the same related to workmen's fares. The committee declined to concur.

TORONTO OMNIBUS EXPERIMENT.

BRITISH V. AMERICAN TYPES.

For the purpose of linking up suburban areas with the city, the Toronto Transportation Commission are conducting an experiment with British, U.S.A., and Canadian omnibuses. The first-named are represented by the Leyland, A.E.C., and Tilling-Stevens machines, while the American vehicles are the Pierce-Arrow, and those of the Fifth Avenue Omnibus Company. The Canadian make is the Veteran. Each type is constructed so that it can be used either for single or double deck operation. A feature of the A.E.C. and Leyland is that the stairs come directly behind the driver. The Fifth Avenue machines are of the front pay-as-you-enter type. In the Veteran the inside passengers leave at the front. Arrangements are also being made to experiment with railless trolley cars.

MOTOR TRAFFIC NOTES.

PLENTY OF MOTOR FOREMEN.—Southwark Borough Council have appointed a new motors foreman at a salary of £21 9s. 4d. per month. They had 252 applicants for the position.

CHEAPER HAULAGE.—Annual tenders received by the Durham County Council show a decrease of 16 per cent. on last year's prices for mechanical haulage and 25 per cent. decrease on horse haulage.

MUDGUARDS FOR MOTOR VEHICLES.—South Shields Corporation have had guards fixed to their motor vehicles, the devices being of a similar make to those used on the North Eastern Railway Company's omnibuses.

A LOADING BY-LAW.—Burnley Watch Committee recommend the Corporation to make a by-law that "no person shall pack any box, hamper, cask, bale, or skip, the falling of which might occasion injury to persons in the thoroughfare, in or upon any cart, wagon, or trolley vehicle without effectually securing it."

CARS LOANED FOR A BISHOP'S JOURNEYS.—The Ipswich Diocesan Board have compiled a list of sixty-two motor car owners willing to place their vehicles at the Bishop's disposal on certain days. In a letter of thanks the Bishop states that he has enjoyed the system for two months, and nothing could be better.

MUNICIPAL MOTOR DEMONSTRATION.—In connection with the annual meeting and conference of the Institution of Municipal and County Engineers, to be held at Cardiff on June 21-24, a demonstration of motor vehicles used in municipal work will take place. As far as possible the machines will be shown under working conditions.

DANGEROUS STORAGE OF PETROL ON OMNIBUSES.—Much damage from fire was sustained by an omnibus running from the Intake tramway terminus (Sheffield) to Killamarsh. The outbreak is supposed to have been due to a passenger dropping a lighted match on the floor near the back seat, where tins of petrol were stored.

ELECTRIC RUNABOUTS FOR BOURNEMOUTH.—Two electric runabouts are to be purchased by the Corporation for the purpose of carrying passengers to and from the bathing huts and beach on the Undercliff Drive. It is stated that the cost of operation will be 2d. per ton-mile, with current at 2d. per unit, while a petrol vehicle would cost 9d. per ton-mile to run.

SLOUGH MOTOR DEPOT.—It has been stated in the House of Commons by the Financial Secretary to the Treasury that the approximate total expenditure by the Government on the Slough motor repair works is £2,500,000. This establishment, it will be recalled, was set up when the German army broke through the British front and captured a large repair depot.

POST OFFICE ELECTRIC TROLLEYS.—The Chester postmaster has inquired if Chester City Council object, from the point of view of street traffic, to the use of electric trolleys or tractors for hauling mails between the sorting office and the railway station. The Watch Committee have decided to raise no objection on the understanding that the vehicles are fitted with rubber tyres.

RIVAL OMNIBUSES AT HULL.—At Hull Watch Committee a deputation of motor omnibus proprietors in the city attended to protest against the granting of licences to omnibus proprietors from other districts who were not ratepayers of Hull. The committee however, adhered to their previous practice, which is to deal with each application from outside proprietors on its merits.

STANDARDISING COACH FARES.—The South-Western and South-Eastern sub-divisions of the Motor Coach Section, Metropolitan Division of the Motor Trade Association, have adopted standard tariffs for 1922. Similar action is being taken in other parts of the country. Eighty undertakings, including omnibus companies running coaches, have agreed to the new tariffs, but trouble is expected from several large owners who refuse to accept the rates.

LEYLANDS SAVE GLASGOW £1,000.—In regard to a proposal to convert a horse-drawn fire escape into a motor vehicle, Glasgow Watch Committee now report that Messrs. Leyland Motors, Limited, have offered to fit the escape on the new motor pump which the firm are now constructing for the Corporation, instead of the usual brackets and ladder, without extra cost. The committee state that the offer will result in a saving to the Corporation of about £1,000.

COMPLETION OF ROAD CLASSIFICATION.—In the House of Lords, Viscount Peel stated that the classification of roads had now been completed. There were 22,189 miles of Class I. roads and 14,400 miles of Class II. roads, out of a total of 177,306 miles of roads. For the current year 50 per cent. of the approved expenditure and maintenance of first-class roads would be paid out of this fund, so that on these roads there was a half and half payment. Something like £7,000,000 out of the £8,500,000 would be expended on the roads.

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MOTOR TRAFFIC

SPARK ARRESTERS.—At a recent meeting of the Highways Committee of Hertfordshire County Council it was reported that the Home Secretary had been informed by the Ministry of Transport that they doubted whether there was any power to make a by-law requiring the provision of spark arresters under the Locomotives on Highways Act, but a Departmental Committee of the Ministry is inquiring into the desirability of requiring such provision.

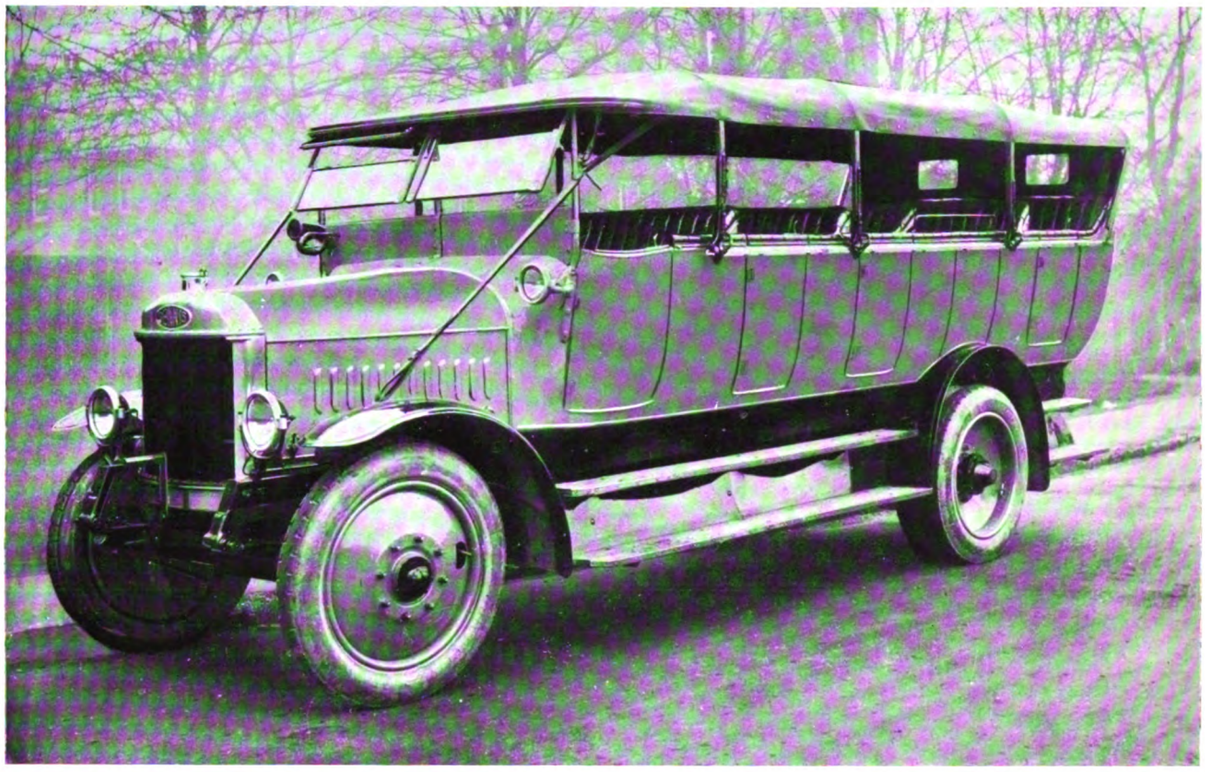
ALCOHOL FUEL FOR LONDON USERS.—As a result of the withdrawal of the Excise Regulations on the use of alcohol for power purposes, the Hammersmith Distillery Company have produced a motor spirit which can now be delivered in London and vicinity either by tank wagon or in 50 gallon barrels. For quantities up to 1,000 gallons weekly the price is 1s. 8½d. per gallon; for quantities between 1,000 and 2,000 gallons weekly, 1s. 8d. per gallon; and for more than 2,000 gallons a week, 1s. 7½d. per gallon.

EASTER OMNIBUS TRAFFIC.—In spite of inclement weather during Easter the London omnibuses carried 500,000 more passengers than last year over the four days. The fact that there were no unwieldy queues at the termini is due to the improved organisation of the central traffic control, and to the availability of more and larger omnibuses to deal with emergency traffic, which is a feature at holiday time. The company are running many more rural services this year. During Easter over 70 of these services were in operation.

A SUBSTITUTE FOR ROAD WATERING.—Marylebone Borough Council have accepted an offer by the Anglo Mex Oil Company to supply a sample barrel of bitumen solution, which, it is stated, can be mixed with water and applied to road surfaces. It is claimed that the solution has the effect of keeping the road surfaces damp and that the roads will probably only require watering once a day. The Council propose to make a trial on a short length of roadway, and report that should the solution prove suitable in all respects its use generally may be advantageous in the event of water shortage.

BRISTOL COMPANY WITHDRAWS CAB SERVICES.—During the past two years the Bristol Tramways and Carriage Company have ceased to work their motor cabs at Cheltenham, Weston-super-Mare, Gloucester, and Bath. At the annual meeting on April 6 the chairman stated that they were forced into that position because their patrons in those places could not afford to pay such charges as would meet the cost of working, etc. The drivers were given the opportunity of taking the cabs over, and had been working them at their own cost and risk. They had to work longer hours, to wash their own cabs, and do a lot of things that they would not have been willing to do when the cabs belonged to the company.

HEAVY VEHICLE RESTRICTION ORDERS.—At the annual meeting of the County Councils' Association, held in London on April 26, Lord Strachie was elected president. In his address Lord Strachie said a matter of the greatest importance was the serious increase in the cost of road construction and maintenance with which rural highways authorities were faced in consequence of the extended use of heavy mechanically-propelled vehicles. A considerable proportion were engaged in through traffic between large towns, and did not benefit the rural districts. Finance was the dominant factor in the situation, and it was essential that the Ministry of Transport should give the most favourable consideration to applications by highway authorities for orders prohibiting or restricting the use of heavy motor vehicles over roads unsuitable for the traffic.



A Dennis Motor Coach on Pneumatic Tyres, Seating 18-20 Passengers.

IMPROVED ROADS AT BLACKPOOL.—Mr. F. Wood, borough engineer of Blackpool, described at a meeting of the North-western District of the Institution of Municipal and County Engineers the method of re-surfacing roads to withstand heavy traffic. It was nothing unusual, he said, for about 300 motor coaches to arrive in the course of a morning, and there were in the town about 150 running over the roads on short and long trips all day long. The macadam roads, which had been attended to at Easter, 1921, had to be repaired in the following September at a cost of about 4s. per super yard. He had now laid a two-coat bituminous surface, and the cost was working out at about 9s. 6d. per super yard, so that this form of road, if it only lasted two years, would be cheaper than ordinary macadam. The eventual cost of maintenance would probably be little more than pre-war cost, especially if the tonnage of traffic was taken into consideration. The taking out of the crown and shaping the road, so that vehicles could negotiate corners and turns with proper elevation and use the sides of the roads, was a great advantage.

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LONDON, MAY 20, 1922.

THE QUESTION OF FARES.

The action of the Leeds Tramways Committee in appointing a special committee to consider the question of fares is significant of the difficulties that tramway managements are encountering at the present time. Wages of the people have fallen largely within the past year, and they must fall further in the near future. Facts have to be faced, and, however unpleasant disillusionment must be, it is now impossible even for politicians to shut their eyes to the conditions that have to be met. The nation is dependent on trade and industry, and these can be kept going only by bringing costs to an economic level. This is true with respect to wages in all trades. In the tramway industry rates of pay have of necessity had to be revised, and they will automatically be reduced in the future. This change in time is bound to be reflected in reductions in fares. It has already had effect in some localities, and there is a growing demand for reductions everywhere. It cannot be denied that the position is one of extreme difficulty. Tramway costs are still high, and the results for the past year's working are in some cases not only disappointing but even alarming. The losses of some municipal tramways will entail substantial contributions from the rates; even those undertakings that have been prosperous in the past find their profits reduced to exiguous proportions. And this is the result with increased fares. A year ago receipts, owing to the higher scale, were rising. Revenue in many cases advanced by leaps and bounds. Now we are in a period of reaction; fares remain at the increased rates, but revenue is falling. In a recent week, out of some fifty of the principal tramways only five reported an increase in receipts on the corresponding week a year ago; many showed large decreases. In a later week only three undertakings out of thirty reported increases, and again there were in many cases heavy declines. The explanation is, of course, simple and sufficient; it is unemployment and lower wages. The people are no longer able to spend as they did when wages shared in the general inflation, and their enforced economy must extend to their tramway journeys. It is a condition that is likely to become more prevalent, and tramway authorities will have in some way to meet it. Higher fares are useless if the people cannot pay them. Whether they can pay them will in the long run clearly be proved by the traffic returns, and these should in each case be closely studied. Every undertaking will have to solve its separate problem, and work out its own salvation. General principles will be of little avail. It is a condition and not a theory that confronts each management. Our present coinage is a difficulty. Were it possible to subdivide the shilling into tenths, as Mr. Allcock has proposed, the proposition from the tramway point of view would be easier. The proposal is receiving some support, but its possible realisation is too remote to be of practical aid. There is, in fact, no solution of the fare question except through the prosaic study of local conditions, persistence in efforts to secure real economy, and the most careful adjustment and re-adjustment of traffic facilities to the needs and spending power of the people.

INSTITUTE OF TRANSPORT.

SUCCESSFUL CONGRESS IN LONDON.

The second annual Congress of the Institute of Transport, which has been held in London this week, has proved in every way a notable success. The programme arranged for the delegates—including visitors from France, Holland, South Africa, Vienna and Shanghai—was of exceptional interest and remarkable variety. No little share of the credit for the admirable organisation of the various meetings and visits of inspection was due to the energetic and genial honorary secretary of the Institute, Mr. H. E. Blain, C.B.E. The Congress was under the presidency of Sir Henry P. Maybury, K.C.M.G., C.B. (Director-General of Roads, Ministry of Transport), who is President of the Institute for the current year. The Congress was preceded on Tuesday evening by a reception at the Hotel Metropole, at which the President received the delegates and their ladies.

The business proceedings were opened on Wednesday at the Institution of Civil Engineers by the President of the Board of Trade (Mr. Stanley Baldwin), on behalf of H.M. Government. Sir H. P. Maybury occupied the chair, and Mr. Baldwin referred to the "vital necessity" which transport constituted for a country like ours. There was no greater difficulty with which we had to contend in this country to-day than the high cost of inland transport, and anything which could be done to remedy this should receive encouragement. The papers read in the session which followed included the following:—"The design, construction and maintenance of highways in relation to the development of mechanically-propelled vehicular traffic," by Col. C. H. Bressey, O.B.E., at which Mr. A. Dryland (county surveyor of Middlesex) presided; "Recent improvements in transport facilities in the Port of London," by Sir Cyril Kirkpatrick; "Wireless as an aid to transport" by Capt. M. H. P. Riall Sankey, C.B., C.B.E. The afternoon of each day was devoted to a series of visits of inspection, the delegates choosing those which more particularly appealed to them. One of special interest on Wednesday was that to the power house of the Metropolitan Railway at Neasden. The visitors were taken from Baker Street by a special electric train, and were first entertained at luncheon by the company at Rickmansworth. Before being shown over the fine electric generating installation they were given an opportunity of viewing the Cedars housing estate and the site of the proposed British Empire Exhibition at Wembley. Other visits included those to the London Docks, Marconi House, the new Great Western aerial road and the Somers Town goods station of the Midland Railway. In the evening the Lord Mayor and Lady Mayoress of London entertained the delegates at a conversazione at the Mansion House.

On Thursday, the papers presented were as follows:—"The future design of road vehicles for passenger and goods services," by Sir John E. Thornycroft, K.B.E., at which the chair was occupied by Mr. E. S. Shrapnell-Smith, C.B.E., and "Inland water transport—a practical policy," by Mr. Neville Chamberlain, M.P. In the afternoon, one of the most attractive visits was that made at the invitation of the Underground Railways and General Omnibus Company, first to the great omnibus overhaul depot at Chiswick, and afterwards to the Underground Railways power station at Lots Road, Chelsea. Luncheon was served at the Chiswick Depot, and the visitors were conducted over the vast and up-to-date shops. The special omnibuses which had brought them here then conveyed the party to Chelsea, where they saw the admirable modern example of electric power equipment, which includes turbo-generators with a total capacity of 78,000 k.w., and also the up-to-date coal-handling, storage and stoking equipment. Alternative tours of inspection on this day were those to the new Waterloo Station and the marshalling yard of the L. and S.W. Railway at Feltham, and the aviation works of Messrs. Vickers, Ltd., at Weybridge.

In the evening the third annual dinner of the Institute was held at the Savoy Hotel, where there was a large and representative company. The President occupied the chair, and among the guests were the Home Secretary (Mr. Edward Shortt); the Minister of

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Transport (Earl Crawford), and the Parliamentary Secretary to the Ministry (Mr. A. Neal). Lord Ashfield (hon. president of the Institute) was unfortunately precluded from attending, but was represented by Lady Ashfield.

At Friday's session the papers were as follows:—"The finance of the modern highway—a problem and a solution," by Mr. Dixon H. Davies; "Foreign Railway practice," by Prof. J. Carlier, of Liége; and "Safety in railway operation," by Col. J. W. Pringle, C.B. In the case of the two latter papers, Sir I. T. Williams occupied the chair. One of the outstanding visits on Friday was that to the Greenwich generating station and the Charlton repair depot of the London County Council tramways. The journey was made by special tramcar, and after a tour of exceptional interest over these two highly efficient plants, the delegates were entertained at tea by invitation of the Council at Charlton. Other tours were those to the works of the Great Western Railway at Reading and the London Terminal Aerodrome, Croydon. At five o'clock, Mr. F. V. Russell, C.B.E., delivered a lecture at the rooms of the Royal Society of Arts, Adelphi, to graduates and students of the Institute, on "The operation of heavy suburban passenger services on a steam railway, with particular reference to density of service, terminal and other facilities." Mr. Arthur Watson, C.B.E., presided.

Saturday was devoted entirely to visits to the following places: The works of Messrs. Dennis Bros., Ltd., Guildford, who entertained the party at luncheon; Liverpool Street Station to see the handling of early morning surburban traffic; the L. & N.W. power station at Stonebridge Park; the Marylebone terminus of the Great Central Railway, where the latest methods of firing locomotives was seen; and the Central and London Trunk telephone exchanges. Free transport facilities on all public service vehicles (Underground trains, tramways and omnibuses) were accorded the delegates.

L.C.C. TRAMWAY MATTERS.

REFORM OF LONDON TRAFFIC ORGANISATION.

At the meeting of the London County Council on Tuesday, the discussion on the recommendation of the Highways Committee with reference to London traffic organisation, presented at the previous meeting, was continued. It will be remembered that the Committee, after reviewing the reports of various Royal Commissions and Committees, advised the Council to make representations to the Government as to the urgent necessity for the unified operation of local transport passenger services in London and adjacent districts and the desirability of setting up a traffic control authority.

After further debate, the following resolution of the Highways Committee was adopted:

"That the attention of H.M. Government be again directed to the resolutions of the Council on the subject of London traffic arrangements, which were communicated to the Government on May 5, 1921; that it be pointed out that the decisions of the Council in question were come to after protracted negotiations had taken place between representatives of the Council and of the London Underground Group of Railways, negotiations that were initiated under the auspices of the Minister of Transport with the object of devising means of meeting in the best possible way the traffic needs of London; that the Government be informed that, in the opinion of the Council, the organisation of London traffic on satisfactory lines is endangered by the continued delay in adopting measures to give effect to the repeated declarations of Royal Commissions and Select Committees as to the pressing need for reform; and that the Government be further informed that the Council considers that the difficulty of reaching a settlement of the traffic problem as a whole will be enhanced by any steps that may be taken by the Government that have the effect of assisting particular traffic undertakings operating in London and the surrounding districts, without recognising the essential community of the traffic interests of the entire area."

"That a copy of the foregoing report be sent to each London Member of Parliament, and that it be referred to the Highways Committee to consider and report what arrangements should be made for the further publications of the report in such a form that the information contained therein will be available to the general public."

WIMBLEDON AND KEW SERVICES.—The Highways Committee reported that in accordance with the decisions of the Council of February 28 and April 11, the Council began on May 2 to operate the whole of the services on the lines of the London United Tramways Ltd., between Wimbledon and the county boundary at Merton, and to run one service to the county boundary at Hammersmith and thence along the company's lines to Kew. Owing to the refusal of the Wimbledon Corporation to consent to the use of trailer cars on the Merton to Wimbledon tramways, trailer cars coming from the Victoria Embankment have to be detached at the county boundary at Merton.

THE NEW COUNTY HALL.—The General Purposes Committee stated that the King had fixed the afternoon of Monday, July 17, for the opening ceremony of the new County Hall. The Establishment Committee reported that additional staff of the Council had recently been transferred to the building, and the total administrative staff now housed there was about 1,600. It was hoped that the main business of the Council would be transferred from the present County Hall so that all meetings after the Whitsuntide recess might be held in the new building, and all Council meetings from the date of the ceremonial opening. A capital estimate of £25,000 was approved for the provision of furniture, excluding carpets and rugs, for the principal floor of the new hall. The title and official address of the new building will be the County Hall, Westminster Bridge Road, S.E.1.

The Establishment Committee recommended that smoking by the staff in the Council's offices during office hours shall not be permitted, except in such rooms as the Establishment Committee decide to be private. Representations were made by the County Council Staff Association that, as smoking had for many years been allowed in Government offices, it should not be prohibited by the Council except in lifts, corridors, etc., and in rooms occupied by officers who are constantly dealing with members of the public in large public rooms. The Committee consulted the heads of departments on the proposal. The Clerk of the Council and one other chief officer were strongly of opinion that smoking should not be permitted. The others either concurred in the proposal or made no observation. Having carefully considered the matter, the Committee decided that as a general rule smoking should not be allowed, but that an exception should be made in the case of members of the staff occupying private rooms.

AGREEMENT WITH LONDON UNITED TRAMWAYS, LTD.—Mr. W. J. Webb repeated his question to the Chairman of the Highways Committee whether the award of £235,000 paid in 1912 to the London United Tramways Company for parts of their system included a sum of £21,125 for 45 alleged derelict tramcars recently handed over to the Council, the majority of which would not run on any tramway system? Had the Committee taken any steps to obtain an allowance for depreciation? Had any steps been taken to set aside the award, which had not been acted upon for so long a period as ten years?

Mr. C. W. Matthews (Chairman of the Highways Committee) replied that the complete history of the negotiations with the Company was contained in the Council's minutes for May 15, 1917. From this it would be seen that the £235,000 was a compromise figure. As to the 45 cars (not 52 as stated), the Company had not run the majority since 1913, but some had been in operation recently. Worn parts of the cars were replaced during the war, and the Company in many cases supplied entirely new parts. All the cars were tested and run before they were taken over by the Council. Although they were not suitable for the L.C.C. system, they would be serviceable on small undertakings where high speed was not essential.

All tramway reports were adopted.

Captain O. Wakeman has resigned his membership of the Highways Committee, and the Committee propose to report at a later date as to filling the vacancy.

MISCELLANEOUS NEWS AND NOTES.

Economy at York.—The morning service of York City tramways is being curtailed during the light-traffic period in order to reduce expenditure, as there is a loss on the undertaking.

Pneumatic Tyres on Edinburgh Omnibus.—Pneumatic tyres have been fitted to one of the omnibuses of Edinburgh Corporation tramways department, and the running of the vehicle is now much smoother.

Electrification of the Melbourne Suburban Lines.—At present 73½ miles of suburban railways have been electrified and, according to the *Victorian Railway Institute Review*, about 70 miles remain to be converted.

No Extension of Leeds and Bradford Boundaries.—The Bill providing for extensions of the boundaries of Leeds and Bradford was rejected at the second reading in the House of Commons on May 11 by 199 votes to 57.

Newport (Mon.) and Sunday Cars.—A poll of the ratepayers of Newport (Mon.) is to be taken to decide whether a Sunday service should be run on the Corporation tramways. The local churches are opposed to the proposal.

The Channel Tunnel.—Mr. Chamberlain stated in the House of Commons on Monday that he was unable to say when a decision upon the advisability of proceeding with the construction of the Channel Tunnel would be reached.

Norwegian Granite Setts.—Of a number of offers for 1,000 granite paving setts received by Dundee Corporation the lowest quotations came from two Norwegian firms, whose offers were about one-third lower than those of Aberdeen granite firms.

Hull Extension Vetoed.—It is reported that the Ministry of Transport have refused the application of Hull Corporation for a light railway order to construct an extension of the tramways to Hessle. The estimated cost of the scheme was £70,000.

Keighley Corporation are inviting applications, as will be seen from our advertisement columns, for the post of tramways manager. An engineer is preferred. The salary will be £400 per annum. Yarmouth has also recently invited applications for a tramway manager, at a salary of £400.

Belfast Conductor Killed by Bomb.—A Belfast Corporation tramways conductor has died from the effects of a bomb explosion at the Ardoyne depot. The bomb was enclosed in an attaché case left in a car, and it exploded (presumably by means of a time-fuse) when the case was being labelled. Three other men were injured.

Isle of Man Tramways.—The Town Council have decided that the summer fares and prices of contract tickets shall be at the same rate as during last summer season. In 1921 contract tickets were sold for £3 10s., and the total revenue from this source was £1,813. It had been suggested that the contract tickets should be abolished, but the recommendation of the Tramways Committee was accepted.

Two L.C.C. Cars Collide.—Two London County Council tramcars collided shortly before midnight on Saturday last at the junction of Dalston Lane with Amherst Road, Hackney. The conductor of one of the cars suffered a fractured arm, one of the passengers was severely cut about the face, and some half-dozen other passengers were treated for bruises and cuts caused by broken glass. Both cars were heavily loaded. At the spot there is a sharp bend in the road, and it is stated that the lights of one of the cars having failed, the driver of the other car was unable to see it until too late to prevent the collision.

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Leeds Tramway Fares.—At a meeting of Leeds Corporation Tramways Committee, Alderman R. A. Smithson presiding, it was decided to appoint a sub-committee to investigate the question of tramway fares, and to report to the full committee at its next municipal meeting. It is understood that the Tramway Committee is desirous, if possible, to adapt the tramway fares to the lower wages now received by many of the people.

The Midland Area Industrial Council for the Tramway Industry has recommended all the undertakings within its district to adopt the vestibule front for all cars. It is urged in support of the request that the dust which is now thrown up from the roads by motor vehicles affects the eyes and the bronchial tubes of the drivers of the cars. The enormous increase in motor traffic has, it is maintained, rendered more protection necessary.

Tramway Catastrophe in Mexico.—Press telegrams from Mexico City state that 13 persons were killed and 70 injured on May 15 in a tramway accident near Sante Fé, a suburb of the city. Two cars collided at the top of a hill and the impact caused one of them to run backward down a steep gradient. The brakes proved ineffectual, and at a sharp curve the car was derailed and fell over the edge of a chasm. Most of the injured were women and children.

Stimulating Tramway Traffic.—With the object of popularising tramway travel, the *Burton Daily Mail* proposes for some weeks to offer a prize of £1 per week for the most accurate forecast of the week's tramway receipts of the Burton-on-Trent Corporation tramways. The *Mail* hopes that the offer "will draw attention to the working man's car and at the same time induce more people to ride and do something toward making the trams a paying proposition."

Railless Traction at Leeds.—The following information relating to the railless traction installation of Leeds City tramways is extracted from the annual report for the year ended March 31, 1922. The length of route now open amounts to 8 miles, 5 furlongs, and there are 10 cars in stock. During the year 206,758 miles were run, and 1,033,507 passengers were carried, averaging five per car mile. The receipts amounted to £13,344, or an average of 15.49d. per car mile. The working expenses were £11,937, an average per car mile of 13.856d. The working expenses per passenger were 2.772d., and the ratio of working expenses to receipts 89.45 per cent.

Black Country Tramways Bill.—The five Black Country tramway companies who are promoting a Bill in the present session of Parliament to synchronise the various dates of optional purchase of their respective undertakings by the municipal authorities are reported to have reached an agreement with these bodies. This will ensure that the Bill will go through as an unopposed and agreed measure. The date fixed for the exercise of the municipalities' option to purchase is, with slight exceptions, December, 1938. The tramway companies concerned are:—The Birmingham District Power and Traction Company; Dudley, Stourbridge and District Electric Traction Company; South Staffordshire Tramways Company; South Staffordshire Tramways (Lessee) Company; and the Wolverhampton District Electric Tramways. A clause will appear in the Bill by which the companies will be obliged, after July 1, 1923, to abandon the 2d. minimum fare, and substitute one of 1½d.

Licences of Tower Repair Wagons.—The Falkirk and District Tramways Company were fined £10 at Falkirk on May 8 for having used a motor tower repair wagon for which a proper licence was not in force. For the prosecution it was stated that while the respondents had made an application to the County Council for a 5s. licence, this was not considered adequate, as the vehicle, not coming under the category of a tractor, was liable to £25 duty annually. The Tramway Company contended that the vehicle was a tractor within the meaning of the Act. Sheriff Robertson stated that he could not conceive any definition of tractor which would be wide enough to include the vehicle in question that would not also include every motor lorry used to carry any kind of burden. The general feature of all tractors, he thought, must be that they drew their burden behind them and did not carry it. He entertained no doubt but that the respondents failed to tender the appropriate amount of duty payable, and therefore he must convict.

"Tramcar and Road Vehicle Brakes."—At a joint meeting of local members of the Institute of Civil Engineers and the Bradford Engineering Society, held in the Technical College, Bradford, on Monday evening, a lecture on "Tramcar and road vehicle brakes" was given by Mr. John W. Dawson, A.M.I.E.E., assistant engineer of the Corporation Tramways. The lecture was illustrated by lantern slides showing the different types of brakes in operation on both kinds of vehicles. Tables and charts were shown giving technical details of the retarding efforts upon both vehicles. The advantage of the tramcar over road motor vehicles in the matter of brakes was clearly demonstrated, in that the tramcar has a retarding effort up to the adhesion of the wheels to the rails, together with a further retarding effort which could be obtained by means of track brakes. Motor vehicles, on the other hand, could only have a retarding effort equal to that of the adhesion of the wheels to the roadway. The lecturer laid great stress on the quality of brake shoes, their linings, and of the brake drums. He pointed out that some forms of steel from which brake drums were made were very soon reduced to such a condition as to be almost useless for braking purposes. In certain cases he had changed such brake drums for others made of cast iron, with very beneficial results. Mr. Dawson insisted that fuller investigation was needed into the question of the material from which brake drums for road-borne vehicles were made, and he deprecated the tendency for brakes to be the last things to be improved on motor vehicles. The engine and driving gear on most vehicles was practically perfect, but brakes so far had, comparatively, not reached that uniformly high standard.

FINANCIAL.

Birkenhead Corporation Tramways made a profit of £2,247 on last year's working. This is in addition to the profit of £5,900 made on the motor omnibuses, which has been appropriated for rate relief.

Leyland Motors, Ltd.—The accounts of Leyland Motors, Ltd., for the past year show a debit balance of £755,516. The previous report, which covered nine months, showed a trading profit of £215,084.

Burton-on-Trent Corporation Tramways.—There was a loss of £549 on the past year's working, compared with a deficit of £3,003 for the previous year. Including capital charges, the deficit was £4,624 against £6,459.

Barcelona Traction, Light and Power Company are offering to holders of 5½ per cent. income bonds an opportunity to exchange for 6 per cent. (formerly 5½ per cent.) first mortgage bonds, on the basis of £1 nominal value of 6 per cent. first mortgage bonds for £5 nominal value of income bonds.

Shanghai Electric Construction Company, Ltd., of whom the general manager is Mr. Donald McColl, have declared a final dividend of 8 per cent. (actual), making 20 per cent. for the year. A similar dividend was paid last year. A sum of £10,000 is placed to reserve and £20,000 to general reserve. In June last, a share bonus of 25 per cent. was distributed out of reserve.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended May 17 amounted to £95,740, a decrease of £12,911 compared with the corresponding period of last year. The route length was 160·73 miles, as compared with 152·52 a year ago. From April 1 (the commencement of the financial year) to May 17 (6½ weeks), the total receipts were £629,219, a decrease of £60,079 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended May 6 give total receipts of £363,351, or £11,727 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £186 10s. 6d. per mile of single track, and last year at the rate of £192 10s. 10d., thus showing a decrease for the week of £6 0s. 4d. per mile open.

Albion Motor Car Company.—Speaking at the meeting of the Albion Motor Car Company on May 17, Dr. T. B. Murray, chairman of the company, said that during the year they had to contend with the rather disastrous action of the Government in the disposal of their surplus mechanical transport, which had the effect of reducing values, especially of the heavy type of commercial motor vehicles, to within 25 per cent. of pre-war prices, irrespective of the fact that wages are still 87½ per cent. above pre-war rates. These war-worn vehicles in hundreds of cases diverted orders which would normally have been received for new vehicles.

Madras Electric Tramways (1904).—The accounts for 1921 show a gross profit of £34,661. After debiting interest and London office expenses, providing for debenture stock, sinking fund, and transferring £10,000 to depreciation and renewal account the balance is £9,744, and £5,555 was brought in, making £15,299. A dividend on the ordinary shares of 5 per cent. for the year, free of tax, is declared, and the sum carried forward is £6,436. Results for the past year were prejudicially affected by a strike which prevailed from January 10 to February 26, and by general depression which prevailed in India. During the strike a service of motor omnibuses was inaugurated and is still competing with the tramways.

Tynemouth and District Electric Traction Co.—The report for the year ended December 31 last shows that the total revenue amounted to £38,147 and expenditure, including the provision of £3,000 for renewals, to £34,286, leaving a balance of £3,860. This sum, added to the amount brought forward of £8,794, makes an available sum of £12,654, which the directors propose to appropriate as follows:—Dividend on the 5 per cent. cumulative preference shares, £1,525; 10 per cent. on the ordinary shares, £4,641; leaving £6,488 to be carried forward. During the past year the company commenced operating a service of motor omnibuses in districts adjacent to the tramways, and the results were very satisfactory.

Reading Corporation Tramways.—The annual report for the year ended March 31, 1922, of the general manager and the engineer (Mr. J. M. Calder) reveals a very satisfactory financial position, as compared with the previous year. There is a net profit on the combined tramways and omnibus undertaking of £2,988, against a deficit in the year before of £14,023. The revenue was £98,822, which compares with £99,924 last year, a decrease of £1,102. The tramway traffic receipts were £80,396, or 23d. per car mile, as compared with £85,120, or 22.3d. per car mile. The motor omnibus receipts were £17,398, or 24d. per bus mile, as compared with £13,916, or 21.5d. per bus mile, an increase of £3,482. The parcels express department shows a profit of £209, as against a loss of £309 last year. Traffic expenses show a decrease of £3,075, and general expenses a fall of £170. Repairs and maintenance cost £24,617, a reduction of £12,500; power expenses were reduced by £3,042 to £10,130. The passengers on the tramcars numbered 11,349,857, a decrease of 1,326,240. The total car mileage was 835,166, a fall of 79,213. The revenue of the omnibuses was equal to 24d. per bus mile, and the expenses to 21.2d. per bus mile. The Tramways Committee have resolved that the net profit be carried

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to the reserve fund, and have recorded their appreciation of the general manager and engineer's management of the undertaking.

Potteries Electric Traction Company.—In their report for the year ended December 31, 1921, the directors state that the traffic receipts for the first few months showed substantial increases on both the tramway and omnibus services, but that the coal miners' strike, competition of independently-owned vehicles, and general trade depression caused a serious falling off in the number of passengers carried. Working expenses continued high during the year, and the report shows that the revenue amounted to £300,831. After deducting all expenses chargeable to revenue, including £11,025 for debenture interest and the provision of £10,000 for renewals, there remains £27,840, as compared with £28,500 for 1920. Including the sum of £6,082 brought forward, there is a balance available for distribution of £33,922. This sum the directors recommend should be applied as follows:—To reserve account, £5,000; dividend on preference shares at 5 per cent., £12,250; dividend on the ordinary shares at 4 per cent. per annum, £9,800, leaving a balance of £6,872 to be carried forward. The reserve fund will then stand at £114,523, and the renewals fund at £55,891.

The English Electric Co., Ltd.—Sir Charles Ellis, G.B.E., K.C.B., presiding at the meeting on May 16, said that during the year the Dick, Kerr works at Preston had been transferred, and the Coventry Ordnance works leased to the company. These changes accounted for the increase in the item, "stocks, works in progress, and debtors." In the aggregate, stocks were very much reduced during the year. As early as 1920 they foresaw that, although orders still continued to flow in, the market was, in fact, being exhausted. Consequently they reduced their stocks to the lowest possible limits. They had met the heavy fall in the market value of materials by the special writing down of stocks to a figure which represented to-day's replacement value or less. The available balance shown in the report was slightly in excess of that for last year. The results were satisfactory, but they felt bound to look ahead, and there were uncertainties on every hand. The state of things abroad was unprecedented: many foreign markets were closed; others still languished. The engineering industry had to face during 1922, owing to a serious industrial dispute, peculiar difficulties. In these conditions what might be regarded in normal times as exceptional prudence became an indispensable precaution. Full wisdom lay in the mean, and the board, in recommending a dividend on the ordinary shares of 5 per cent., considered that they had not unfairly reconciled the natural expectations of shareholders with the needs of a difficult and obscure period to come. Referring to the chaotic condition of the markets, he said that while they welcomed Government assistance, both direct and indirect, particularly as regarded finance, he was strongly of opinion that the best way out of the present difficulties would be found through the efforts of private enterprise. With the assistance of five powerful associations of world-wide reputation, they had recently formed the Power and Traction Finance Company, Ltd., with the object of dealing with comprehensive engineering contracts on a large scale. In spite of general economic conditions, it remained true that the electrical industry had been less seriously affected than many others. It had the advantage among the industries of this country of youth and vigour. During the last year they had secured many important contracts. Among them were a complete central station installation for the borough of Leicester, and important railway electrification contracts in Spain and Japan. On the technical side, their business had been one of ceaseless activity. In many cases entirely new lines of machinery had been developed. The effect of specialising certain factories to particular kinds of operation had already resulted in reduced costs and better production.

BUSINESS NOTES.

Thermit, Ltd., now a constituent company of Nobel Industries, Ltd., have issued an interesting and well-printed brochure (40 pp., 9 in. × 5½ in.) on "The Welding of Rails by the Patent Alumino-Thermic Process." The pamphlet describes and illustrates the method of making Thermit welds both on new and worn tracks. There is also a note on the welding of third or conductor rails, and a description of a rail grinder and planer, with reports of tests made on welded and unwelded rails.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London,
W.C.2.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	May 10	2,623	3,652	+ 1029	49½	172,726	— 13,168
„ Motor Buses	„ 10	255	193	— 62	49½	10,885	+ 8,784
Ayr Corporation ..	„ 13	608	542	— 66	52	35,336	— 2,841
Barrow Corporation ..	„ 13	819	563	— 256	6	3,632	— 1,545
Belfast City	„ 12	12,972	12,607	— 365	6	73,362	— 4,591
Birkenhead Corporation	„ 14	2,324	2,487	+ 163	6½	15,884	— 157
„ Motor Buses	„ 14	686	681	— 5	6½	4,236	+ 552
Birmingham Corporat'n	„ 6	30,571	29,020	— 1,551	5	147,197	— 16,625
„ Motor Buses	„ 6	2,081	1,786	— 295	5	9,047	— 1,828
Blackburn Corporation	„ 10	*1,102	2,560	+ 1,458	6½	15,639	+ 274
Bradford Corporation..	„ 13	12,007	14,101	+ 2,094	7	86,819	+ 303
Burnley Corporation ..	„ 15	1,445	3,307	+ 1,862	..	..	..
Burton-on-Trent Corp.	„ 14	686	525	— 161	6	3,419	— 527
Bury Corporation ..	„ 14	1,950	2,520	+ 570	6½	15,594	— 530
Chatham & District ..	„ 4	1,680	1,597	— 83	18	26,705	— 2,728
Chesterfield Corporat'n.	„ 8	1,360	1,269	— 91	5	6,990	— 582
Derby Corporation ..	„ 13	1,939	2,149	+ 210	6	13,064	— 768
Dundee City ..	„ 10	3,368	2,992	— 376	51½	161,282	+ 1,656
East Ham Corporation	„ 13	1,965	2,165	+ 200	6½	13,326	+ 520
Edinburgh Corp. Trys.	„ 6	..	12,118	..	51	631,524	— 45,972
„ Motor Buses	„ 6	..	3,553	..	51	178,455	..
Glasgow Corporation ..	„ 13	49,351	45,313	— 4,038	49½	2,231,089	— 27,425
Glossop (U.E. Sup. Co.)	„ 13	242	221	— 21	19	4,337	— 214
Halifax Corporation ..	„ 9	3,503	4,323	+ 820	5½	23,839	+ 206
„ Motor Buses	„ 9	95	55	— 40	5½	325	— 270
„ Railless Cars	„ 9	..	61	..	5½	324	...
Huddersfield Corporatn.	„ 13	5,401	5,261	— 140	7	37,111	— 1,238
Ilford U.D. Council ..	„ 13	1,567	1,506	— 61	6½	9,314	+ 159
Ipswich Corporation ...	„ 13	723	784	+ 61	6	4,925	— 26
Isle of Thanet ..	„ 10	725	825	+ 100	31½	20,312	+ 921
Kilmarnock Corporat'n	„ 13	426	420	— 6	51½	18,277	— 957
Leicester Corporation..	„ 13	3,013	7,617	+ 4,604	19	137,279	+ 18,546
Liverpool Corporation	„ 13	24,359	29,731	+ 5,372	19	548,190	+ 23,784
London County Ccl. ..	„ 17	108,651	95,740	—12,911	6½	629,219	— 60,079
Maidstone Corporation	„ 11	403	458	+ 55	5½	3,049	— 54
Manchester Corp. ..	„ 13	39,410	37,263	— 2,147	6	228,837	— 10,307
Newcastle-on-T. Corp.	„ 6	10,532	9,685	— 847	5	51,204	— 4,800
Nottingham Corp.	„ 11	4,946	7,800	+ 2,854	6	45,235	+ 6,351
Oldham Corporation ...	„ 14	5,043	4,448	— 595	7	33,423	— 1,107
Preston Corporation ...	„ 10	1,766	1,798	+ 32	5½	10,317	— 536
„ Motor Buses	„ 10	..	124	..	5½	744	..
Reading Corporation ...	„ 11	1,408	1,635	+ 227	6	9,103	+ 157
„ Motor Buses	„ 11	302	340	+ 38	6	1,973	+ 179
Rotherham Corporation	„ 15	2,150	2,065	— 85	6	12,906	+ 323
Salford Corporation ..	„ 14	11,122	10,603	— 519	6½	65,208	— 3,172
Sheffield Corporation..	„ 14	19,071	18,288	— 783	6½	113,997	— 4,490
Southampton Corp. ..	„ 10	2,117	3,203	+ 1,086	5	17,300	+ 1,292
„ Motor Buses	„ 10	392	103	— 288	5	582	— 621
Southend-on-Sea Corp.	„ 10	1,236	2,257	+ 1,021	6	13,012	+ 3,402
South Shields Corp. ..	„ 13	1,412	1,601	+ 189	6	10,311	+ 1,160
St. Helens Corporation	„ 9	1,664	1,602	— 62	6	8,839	— 882
Sunderland Corp. ..	„ 14	2,312	2,393	+ 81	6	15,278	+ 421
Swindon Corporation..	„ 10	385	399	+ 14	5½	2,062	— 186
Tyneside Trys., Trds...	„ 3	1,120	778	— 342	18	14,528	— 6,715
Wallasey Corp. ..	„ 13	2,420	2,637	+ 217	6½	15,798	— 769
„ Motor Buses	„ 13	273	219	— 54	6½	1,388	+ 32
Walsall Corporation ..	„ 13	1,661	1,589	— 72	6	10,283	— 165
„ Motor Buses	„ 13	848	855	+ 7	6	5,785	+ 162
Walthamstow U.D.C....	„ 13	2,211	1,978	— 233	6½	11,603	— 887
Warrington Corp. ..	„ 11	1,016	963	— 53	6	5,917	— 295
West Ham Corp. ..	„ 11	5,119	5,889	+ 770	5½	33,984	— 1,260
Wolverhampton Corp.	„ 17	3,225	2,025	— 1,200	7	14,867	— 1,440
„ Motor Buses	„ 17	907	613	— 294	7	4,481	+ 90

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1921.	1922.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	May 13	£81,480	86,857	19	£1,595,620	+ 65,833
Ballarat & Ben. (4 wks.)	Feb. 26	4,701	4,797	48	55,454	+ 3,216
Brazilian Traction (Mrs)	Mar.	13,102,000	15,238,000	13	44,743,000	+ 6,825,000
Brisbane	April	47,750	48,700	17	192,590	+ 9,055
British Columbia $	Mar.	867,083	849,680	39	7,771,665	+ 140,144
Buenos Aires Lacroze ..	April	60,238	57,619	44	579,438	+ 8,486
Burmah Tr. & Lght. Rs.	Mar.	50,931	60,926	34	463,423	+ 55,324
Calcutta .. Rs.	May 13	84,974	109,399	19	2,020,627	+ 689,901
Cape Town	April	27,602	28,657	..	..	..
Carthagena & Herrerias	April	2,329	2,991	17	10,984	— 287
Cordoba	Mar.	21,717	25,382	52	277,368	+ 39,922
East India	April	4,560	4,065	39	37,082	— 905
Kalgoorlie ..	Feb.	* 316	2,031	8	4,211	+ 1,747
La Plata ..	Mar.	* 3,403	7,067	13	20,109	+ 9,471
Madras (2 weeks) Rs.	May 15	* 51,072	48,663	19	444,842	+ 148,890
Manila .. .. $	Mar.	298,317	284,576	13	903,829	— 22,255
Montevideo	April	46,189	47,960	26	279,419	— 7,458
Para	April	22,289	23,061	21	112,507	— 1,000
Pernambuco	May 14	3,437	3,263	19½	68,802	— 14,964
Port Elizabeth	April	7,082	6,892	..	..	..
Rangoon .. Rs.	Mar.	158,121	150,500	13	418,933	+ 17,536
Shanghai .. $	April	157,500	184,500	17	720,217	+ 94,478
Singapore .. $	April 1	13,268	13,300	13	192,337	+ 36,087
Winnipeg .. $	Mar.	495,208	464,900	13	1,436,334	— 25,228

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

Common Fund Companies.		
Metropolitan District Rly. Co. ..	Week ending May 13, 1922 ..	£239,846
London Electric Rly. Co.	Corresponding week last year ..	245,503
City & South London Rly. Co. ..	Decrease	5,657
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	4,121,380
London General Omnibus Co., Ltd.	Corresponding period last year ..	4,396,971
	Decrease	275,591

London & Suburban Traction Group		
Metropolitan Elec. Tramways, Ltd.	Week ending May 13, 1922 ..	£53,775
London United Tramways, Ltd.	Corresponding week last year ..	54,466
South Met. Elec. Tr. & Ltg. Co., Ltd.	Decrease	691
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	884,628
	Corresponding period last year ..	976,751
	Decrease	92,123

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending May 13, 1922 ...	£32,396	£3,746	£36,142
Total Receipts (19 weeks) ...	624,291	71,373	695,664

MERSEY RAILWAY			
Week ending May 13, 1922 ...	—	—	£4,136
Total Receipts (19 weeks) ...	—	—	88,318

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LONDON, MAY 27, 1922.

THE NEW ROAD VEHICLE COMMITTEE.

The formation by the Minister of Transport of a committee to consider the construction and regulation of hackney vehicles is dictated by a pressing need of the moment. The rapid development of motor traffic, especially in the case of the motor coach and omnibus, has made it imperative that these vehicles should be built on well-defined and efficient lines and that their use of the highway should be subject to adequate control. It will be recalled that the Departmental Committee on the Taxation and Regulation of Road Vehicles issued its second interim report on April 13. Several members of that committee will also serve on the newly-formed body. The functions of the two committees may, indeed, overlap to a certain degree, though of course the later committee will only be concerned with passenger-carrying vehicles. The terms of reference indicate that its deliberations will cover a wide field. The committee is to review existing legislation and practice in connection with the use, construction and regulation of all forms of passenger vehicles (except the tramcar and the railless trolley omnibus), and is also to consider the question of parking. The new body is representative of all the interests concerned. A good proportion of its members have been delegated from associations of municipal and county authorities—a fact calculated to ensure that regard will be paid not only to the construction and safety of vehicles themselves, but to the urgent matter of their effect on road surfaces. Tramway managers and highway engineers have this problem of expensive maintenance constantly before them, and the anxiety which it has occasioned was again emphasised only last week at the London Transport Congress. Several speakers there expressed concern as to what form the future design of road vehicles would take and as to what degree of relief they might expect for their sorely tried roads. Mr. Fell, the general manager of the London County Council tramways—to take but one instance—remarked that he had heard no suggestion that the weight of future motor vehicles was likely to show a decrease. It might be, he said, that the designer of the latest passenger vehicle was reducing weight per seat, but that was in order to put on a larger load. There was a strong feeling, too, that an increase in the number of road wheels would tend to lighten road-wear, but here again it was pointed out by Mr. F. Churchill that the maker would merely put the maximum permissible load on each wheel. Another point to which the new committee might devote useful attention is that of the width of motor coaches. Many of them are too wide for some of the country roads over which they travel, and this fact, together with the presence of an excessive rear overhang, constitutes a serious menace to other road users. Some of the more progressive constructional firms have, of course, already overcome these defects, and little, if any, criticism can be levelled at their vehicles. But much remains to be done, and it is hoped that the Transport Ministry's latest committee will see that it is done.

REGULATION OF ROAD VEHICLES.

NEW COMMITTEE APPOINTED BY TRANSPORT MINISTER.

The Minister of Transport has appointed the following Committee to consider the regulation and control of hackney vehicles in Great Britain, and the parking of road vehicles :—

Sir Henry Maybury, K.C.M.G., C.B. (chairman), Director-General of Roads, Ministry of Transport; Mr. A. G. Asher, Association of County Councils of Scotland; Sir Thomas Berridge, K.B.E., Royal Automobile Club; Mr. F. H. Berryman, County Councils Association; Sir Stenson Cooke, Automobile Association and Motor Union; Mr. F. L. D. Elliott, C.B., Police Authorities; Sir Robert Fox, County Boroughs Association; Mr. A. Grierson, Scottish County Burghs; Mr. R. J. Howley, M.Inst.C.E., Provincial Charabanc Interests; Mr. W. Rees Jeffreys, Society of Motor Manufacturers and Traders; Sir Walter Nicholas, Urban District Councils Association; Mr. F. Pick, London and Provincial Omnibus Owners Association; Mr. E. S. Shrapnell-Smith, C.B.E., Commercial Motor Users' Association; Mr. C. W. Tindall, Royal Agricultural Society; Mr. Seymour Williams, Rural District Councils Association; A representative of the Ministry of Health.

The terms of reference are as follows :—

(1) To consider existing legislation and practice in connection with the use, construction and regulation of road vehicles (other than tramcars and trolley vehicles) employed for the purpose of carrying passengers for reward and to report thereon; (2) to consider and report as to what, if any, powers it is desirable should be conferred on local, police or other authorities to make arrangements for and/or to require road vehicles to be parked either on public highways or elsewhere in the interests of the owners or drivers of such vehicles, and with a view to the reduction of traffic congestion.

L.C.C. TRAMWAY MATTERS.

At the weekly meeting of the London County Council on Tuesday it was agreed, provided the Hackney Metropolitan Borough Council consented under the standing orders of Parliament to the introduction of the necessary Bill to authorise the proposed tramways in Amhurst Park, to bear the cost of paving with wood the breasts of the carriage-way in Amhurst Park within the borough of Hackney. The Highways Committee recommended that a similar arrangement should be made with the Stoke Newington Metropolitan Borough Council as regards the proposed new tramway from Seven Sisters Road to Stamford Hill, via Amhurst Park, the borough councils to bear the cost of the concrete foundations and to undertake the future maintenance of the paving. The extra cost involved by the proposal, about £1,400, is not anticipated to increase the cost of the total estimate for the construction of the lines on the overhead system of electric traction, owing to the fall in construction costs since the estimate for the scheme was presented to the Council last year.

Tube Extensions.—At the meeting of the London Electric Railway Company and the City and South London Railway Company held on Tuesday, the Parliamentary Bills for tube extensions and reconstruction were approved. Lord Ashfield, who presided, said that the former company was authorised to extend the Hampstead line 4½ miles from Golders Green to Hendon and Edgware, while the latter was authorised to enlarge its tunnel, re-equip the railway and purchase new rolling stock. Other improvements would have the result of more than doubling the capacity of the train service upon both lines. Under the terms of the Trade Facilities Act, 1921, the company had asked the Treasury to authorise the issue of up to £6,000,000 of second debenture stock. It was intended to ask Parliament for powers to charge the interest on capital construction and to extend the time for the completion of the work to August 31, 1926, although it was hoped to complete the work by 1924.

Dublin Sunday Service in Abeyance.—The service of the Dublin United Tramways Company was stopped on Sunday last owing to the failure of negotiations between the management and their employees regarding payment for time worked on Sundays beyond the specified and agreed 48-hour week. The men, who are members of the British Transport and General Workers' Union, ask that any hours worked on Sunday over and above the 48 should be paid for at the rate of time and a half per hour. The directors of the company state that they had not even had an opportunity of investigating any cause of complaint, and feel sure that this sudden stoppage cannot be justified.

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MISCELLANEOUS NEWS AND NOTES.

Proposed Purchase of Paisley Tramways.—Glasgow Tramways Committee have now recommended the Corporation to offer £200,000 to the Paisley District Tramways Co. for their undertaking.

L.C.C. Tramways Bill.—In the House of Commons on Monday, the London County Council (Tramways and Improvements) Bill passed the report stage, and was ordered to be read a third time.

Ashton Tramway Service.—Alderman R. S. Oldham, chairman of the Ashton-under-Lyne Tramways Committee, claims that their cars carry more passengers per mile than any other tramway service in the country.

Nottingham Tramway Employees' Ballot.—Nottingham tramway employees have decided to take a ballot on the question of acceptance or otherwise of the proposed alteration of working hours and conditions of service.

Season Tickets at Dundee.—Season tickets are to be introduced on Dundee Corporation tramways. The committee cannot recommend an all-round reduction of fares at present, but cross-over fares are to be inaugurated.

Sunday Cars at Newport.—The ratepayers of Newport (Mon.) have decided by ballot that the Corporation tramcars shall be run on Sundays. The polling figures were: For, 12,731; against, 5,232; majority in favour, 7,499.

Fusion of Transport Workers' Unions.—The Associated Society of Locomotive Engineers and Firemen have endorsed the scheme to link up all grades and sections of transport and railway workers in the National Transport Workers' Federation.

Belfast Tramcar Set on Fire.—A Belfast tramcar was on Wednesday saturated with paraffin by armed men and allowed to run citywards in a blazing condition for half-a-mile, until someone removed the trolley-pole. Residents then extinguished the flames.

Charges for Tramway Power.—Walsall Town Council propose to reduce by 20 per cent. the charge for electricity supplied to the tramways department. Barrow Electricity Committee have refused the application of the Tramways Committee for a reduction in the charge for power.

Omnibuses from Rotherham to Doncaster.—The Rotherham Corporation have applied to the Minister of Transport for consent to the running by them of omnibuses commencing at the Thrybergh tramway terminus and proceeding via the Doncaster Road to the Warmsworth terminus of the Doncaster Corporation Tramways.

Newcastle Tramway Extensions.—The Newcastle Corporation Transport and Electricity Committee are making good progress with their tramway extensions. The Fenham extension across the Two Ball Lonnen and on to the main Westerhope Road and the diversion to Newburn will, it is expected, be opened early in June.

Centre Poles for Edinburgh.—The Edinburgh Tramways Subcommittee have rejected the design for the Princes Street centre poles provided by the Edinburgh College of Arts, on the ground that the scroll work at the top was too elaborate. A simpler design has been adopted, and 33 of these standards will be erected. The existing 39 electric standards will be removed from Princes Street, and under the new arrangement there will be fewer poles than formerly.

The Electricity (Supply) Bill was read a second time in the House of Commons on Wednesday. Mr. Neal (Parliamentary Secretary to the Ministry of Transport) said it was the desire of the Government to retain Parliamentary control, and he was advised that that was done by the Bill, but he was prepared to consider, in Committee, any amendments to secure the reasonable and adequate protection of the control of the House over expenditure by the Electricity Commissioners.

Leeds Express Tramway Route Opened.—The new "express" tramway route of Leeds City tramways from Harehills to Oakwood (which was illustrated and described in our issue of March 16, 1922) was informally opened for traffic on Sunday last. The track, which is laid on sleepers railed off at the side of the road, was previously inspected by Major Hall, P.C., of the Ministry of Transport. The construction of the remainder of the express route along Prince's Avenue to Roundhay is proceeding.

Threatened Strike in Manchester.—A strike of employees in the Tramways and Highways Departments of Manchester Corporation is threatened over the recent arbitration award reducing wages. The men in the Tramways Department affected are those employed on the permanent way. A resolution has been passed by the men declining to accept any reduction of wages or any increase in hours. A conference will be held between representatives of the Corporation and the men's union on Monday next.

Bradford Stipendiary and Stationary Tramcars.—The Bradford Stipendiary gave judgment on May 19 in a case in which a partner in a Halifax firm of motor haulage contractors was summoned for not keeping a motor wagon on the right or off side of the road when passing a certain carriage. The Stipendiary said it was contended by the prosecution that under Section 28 of the Town Police Clauses Act, 1847, the defendant, in passing two tramcars which were standing almost side by side, should have kept to the off side of the road, as there was not sufficient reason for deviation to the left. Defendant contended that the tramcar was not a "carriage" within the meaning of the Act; and that, assuming the Act applied, then the fact of there being two stationary cars close together on different lines created the actual necessity or sufficient reason for deviation to the left. He (the Stipendiary) considered that in the present case there was such a condition of things as amounted to a case of actual necessity or sufficient reason for deviation, especially excepted in the Act. The summons was dismissed.

Institution of Electrical Engineers.—The result of the ballot for the election of officers and new members of the Council of the Institution of Electrical Engineers for 1922-23 is as follows:—President: Mr. F. Gill; Vice-presidents, Dr. W. H. Eccles, F.R.S., and Mr. A. A. Campbell Swinton, F.R.S.; Honorary Treasurer, Sir James Devonshire, K.B.E.; Ordinary Members of Council, Mr. J. W. Beauchamp, Mr. R. A. Chattock, Mr. F. W. Crawter, Mr. D. N. Dunlop, Major K. Edgcumbe, Mr. A. F. Harmer, Mr. W. R. Rawlings.

Fares at Sheffield.—Mr. A. R. Fearnley, general manager of the Sheffield Corporation tramways, has stated to an interviewer that their fares were, on an average, only 70 per cent. higher than in pre-war times, and were nearer pre-war rates than the general cost of living figures. The tramways were now barely paying their way, and the margin on the right side was so small that many necessary extensions of routes were being held up. To reduce fares at the present time would result in a loss for the undertaking and the placing of an additional burden on the general body of ratepayers.

Railways and Road Traffic.—The Bill promoted by the L. & N.W. and Midland Railway group, in which they seek powers to operate road motor services for the carriage of goods, was again considered by a Select Committee of the House of Commons this week. Mr. Henry Thornhill, solicitor to the L. & N.W. Railway, replying to Mr. Macmillan, K.C., for the promoters, said an agreement had been entered into with the Society of Motor Manufacturers and Traders under which the railways undertook to refrain, for a period of five years, from manufacturing vehicles and from carrying passengers.

Action Against Dundee Corporation.—The action of interdict brought by Dundee, Broughty Ferry and District Tramways Co. against Dundee Corporation to stop the latter from running an omnibus service from the High Street, Dundee, to Castle Green, Broughty Ferry, was concluded in the Court of Session on Saturday last. The respondents contended that the omnibus service was being conducted purely, and as a temporary measure, for testing traffic. Complainers asserted that it was not merely a test service and that it was causing them to lose money. Lord Blackburn reserved judgment.

Future of Croydon Tramways.—Addressing a special meeting of Croydon Chamber of Commerce, Councillor A. A. Thomson (chairman of the Corporation Tramways Committee) said he held the view that with a properly re-constructed track and up-to-date equipment and service there was no reason why Croydon should not make the tramways service pay as well as the London County Council might do. He thought they had an undertaking which should be retained for the benefit of the borough, and suggested that tenders should be invited for the reconstruction of the track from Norbury to Purley, the work to extend over a period of five years.

Offer to Purchase Glasgow Subway.——Glasgow Corporation decided on Thursday to offer £385,000 for the Glasgow Subway, this figure including £100,000 for properties aboveground. The Subway has been closed for some months, and it was stated that an expenditure of about £100,000 would be necessary to convert the system from cable to electricity, and bring it up to date. The directors originally asked £500,000, and pointed out that it was only one-third of what the tunnels cost when constructed about twenty-five years ago. It was also stated that the board are now prepared to recommend the shareholders to accept the £385,000, which would admit of them being paid 10s. for each £10 share.

Plymouth, Stonehouse and Devonport Tramways Co. will cease to exist as a separate undertaking on June 30, on account of expiration of the lease, and the system will be transferred to the Plymouth Corporation. The whole of the services after that date will be run entirely with the present Corporation rolling-stock, but a number of the cars purchased from the Tramways Company will be reconstructed and utilised as soon as practicable. The employees of the company, numbering 62, have been given the opportunity of applying for employment with the Corporation, and nearly all of them have done so. The general manager of the Plymouth, Stonehouse and Devonport Co. is Mr. A. E. Maddock.

Hackney Carriage Proprietors' Federation.—Mr. Arthur Neal, Parliamentary Secretary to the Ministry of Transport, was present at a conference held at the Shaftesbury Hotel, London, on Tuesday, when a new National Federation of Hackney Carriage Proprietors was inaugurated. Mr. Neal said that at the present moment there was a very strong agitation by people who considered that the motor owners did not pay enough for upkeep of the roads. Local authorities looked with dismay on the present cost of the upkeep of roads; while motorists looked with dismay on the cost of taxation, quite ignoring the fact that the present horse-power taxation did not impose a heavier burden on them than did the petrol taxation for which it was substituted. There was no body of men to whom it was more important to have good roads capable of dealing with modern traffic than themselves.

The Birmingham Tramways War Memorial will be dedicated on Sunday, May 28, with appropriate ceremony. Lieut. F. Clarke, M.M., of the Dorset Regiment, will unveil the memorial, after a statement by Mr. A. Baker, the general manager of the Corporation Tramways, and an address by the Lord Mayor. The memorial will be dedicated by the Bishop of Birmingham. This fine memorial, which is 20 ft. in height, has been erected on the Tramway Stadium, King's Heath, and is enclosed in a formal garden fenced off from the playing field by a beech hedge. The cenotaph is built of Portland stone with panels of Hopeton Wood stone, which contain the names

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of 300 of the fallen. The central portion is surmounted by an urn and carved on the upper portion is the inscription, "Our Glorious Dead." The chief panel bears the City Arms, and the inscription, "To the glorious memory of our comrades who, during the Great War, made the supreme sacrifice for home and country."

S.E. and Chatham Railway Electrification.—A meeting of the proprietors of the South-Eastern Railway Company has been convened for June 2 to consider a proposed application, in concert with the London, Chatham, and Dover Railway Company and the South-Eastern and Chatham Railway Companies Managing Committee to the Minister of Transport for an order or orders authorising the companies and the committee to construct and maintain generating stations and other electrical works, and to enter into agreements for the supply and use by them of electrical plant, rolling stock, and equipment, and in particular to enter into an agreement with a construction company for the electrification of the suburban lines of the South-Eastern and Chatham Railway Companies. The terms of the agreement provide for the electrification of these lines by the construction company and a lease to the railway companies by the construction company of the generating station and electrical works, rolling stock, plant, and equipment. The cost of construction will be raised by debentures or debenture stock of the construction company, to be redeemed at latest in June, 1947.

Liverpool Tramways.—Liverpool Corporation Tramways and Electricity Committee made an inspection, on May 18, of Lambeth Road Works, where a number of tramway cars are being repaired and some new ones constructed. At luncheon at the Midland Adelphi which followed Dr. Utting, Chairman of the Finance Committee, observed that one of the best ways of enabling city councillors to familiarise themselves with the work that was going on was to arrange for such inspections. Liverpool's tramway operations were improving. Cheap and inexpensive transit was vital to the development of the city, and he congratulated the committee upon the recovery of their undertakings from the stress and strain of the war. The chairman of the committee (Mr. Frank Wilson), who presided, gave a resumé of the year's working. They had spent large sums during the last three years in renewals. They had now 618 cars in service, of which 450 were 20 years old. Many of them ought to be scrapped. He thought their increased fares were justified, but later in the year they hoped to consider the question of cheaper fares. Mr. J. A. Brodie, City Engineer, said that the new Prescot Road was a typical arterial road which would develop the city and its environs. The expense of its construction was being borne by the Corporation, the Lancashire County Council and the Ministry of Transport.

FINANCIAL.

British Electric Traction Company.—The directors recommend, subject to audit, the payment of a dividend of 4½ per cent. on the ordinary stock for the year ended March 31, 1922, compared with 4 per cent. for the previous year.

La Plata Electric Tramways.—The profit for 1921, after providing for debenture and other interest, was £2,720, making with £14,531 brought in £17,251. To reserve is placed £10,000, and the carry forward is £7,251, subject to corporation tax, if any.

Blackburn Corporation Tramways.—The annual report of the general manager (Mr. J. H. Cowell) shows that, after payment of interest on loans, sinking fund, etc., the net profit for the year is £1,646, compared with £751 in 1920-21. The decrease in mileage was 157,144, and in passengers 2,601,339.

Gravesend and Northfleet Electric Tramways, Ltd.—The profit for 1921, after providing £11,576 for repairs, renewals and maintenance, and meeting debenture interest, etc., was £400, making available, with £4,944 brought in, £5,344. To reserve is placed £1,000 (making £10,687), and £4,258 is carried forward.

Anglo-Argentine Tramways Company.—The net revenue for 1921 was £303,647, making with £15,885 brought in £319,532. The directors recommend dividends on five and a half per cent. cumulative first preference shares for the year and on five and a half per cent. cumulative second preference shares in satisfaction of 12 months' arrears to December 31, 1917, carrying forward £6,032.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended May 24 amounted to £99,954, a decrease of £4,098 compared with the corresponding period of last year. The route length was 160·73 miles, as compared with 152·52 a year ago. From April 1 (the commencement of the financial year) to May 24 (7⅞ weeks), the total receipts were £729,185, a decrease of £64,166 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings of the United Kingdom for the week ended May 13 give total receipts of £370,964, or £11,783 more than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £190 8s. 7d. per mile of single track, and last year at the rate of £184 7s. 8d., thus showing an increase for the week of £6 0s. 11d. per mile open.

Birmingham District Power and Traction Company.—The net revenue for 1921 from tramways dividends and interest on investments was £99,830. After deducting payments to local authorities, income-tax, etc., the surplus was £62,840, plus £4,508 brought in, making £67,348. After charging interest on debenture stock, providing for renewals, dividend on cumulative participating preference shares, and placing £9,430 to debenture sinking fund, the balance was £25,657. The directors recommend dividend of 6 per cent. on the ordinary shares, carrying forward £2,981.

Birmingham Corporation Tramways.—The accounts for the year ended March 31, 1922, show a net surplus, after paying interest and sinking fund charges, of £192,500. This amount is, however, absorbed by the large scheme of reconstruction undertaken during the year. The total revenue was £1,520,740, against £1,656,654, for the previous year, a reduction of £135,914, due chiefly to the trade depression. Operating expenses were reduced by £164,353 during the year, and the number of passengers carried was 183,500,000, compared with 218,000,000 in the previous twelve months.

Johnson & Phillips, Ltd.—The report for 1921 shows a profit (including claim for repayment of excess profits duty), after making provision for bad and doubtful debts, and after charging to revenue upwards of £16,000 for maintenance of buildings, plant, etc., of £42,737, plus £38,727 brought in. Deducting directors' remuneration, debenture interest, etc., £18,428 for income and corporation taxes, and £12,255 for depreciation on machinery, etc., there is to be carried forward £15,138. In view of the present state of trade caused by the engineers' lock-out and the consequent falling off of business, the directors do not recommend payment of a dividend.

Huddersfield's Improved Position.—The chairman of Huddersfield Tramway Committee (Councillor T. Canby) informed the Town Council that the past year was begun with a deficiency of £15,086, but they now had the satisfaction of a balance of £3,105. The manager and staff were to be congratulated on the result. The money had been wisely spent, and they had obtained real and good results from the work. On the running of the omnibuses there had been a loss of £724, which was very satisfactory. There was a small loss for the first 15 months, but the omnibuses acted as feeders to the tramcars. At least 25 per cent. of the people who had been carried in the omnibuses had continued their journeys in the cars. The Council were also about to purchase seven new vehicles of a lighter type than those now in use.

British Thomson-Houston Company, Ltd.—In their report for the year 1921 the directors mention that the extensions to the Rugby works, which were begun in 1919, have practically all been completed. The changes in the works at Birmingham have been carried out and the works are in operation. Owing to the expansion of the company's business, the London offices were removed to Crown House, Aldwych, W.C.2. The profits for the year, after deducting all expenses and charges other than interest on debentures and loans, were £509,258, and including the amount brought forward from last year, £225,891, and deducting interest on debentures and loans, £119,446, there is an available balance of £615,703. The directors recommend that £160,000 should be appropriated for depreciation, reserves, etc., and that dividends should be paid of 7 per cent., free of tax, on the preference shares (£105,000) and 6 per cent. on the ordinary shares (£120,000), leaving £230,703 to be carried forward. During the year an issue of £1,500,000 par value 7 per cent. mortgage debenture stock was made, and the issue was largely over-subscribed. From the proceeds, the company's indebtedness was substantially reduced, and since December 31 the entire amount due to the International General Electric Company, Inc., has been paid off.

Liverpool Corporation Tramways.—The annual report of the Liverpool Corporation tramways for the year 1921 shows that the total revenue amounted to £1,558,907, while the operating costs, including rental of leased lines, were £1,300,785, leaving a gross profit of £258,122. After deducting interest (£54,787), sinking fund and repayment of loans (£46,650), there was a surplus of £156,685. The traffic was adversely affected, as elsewhere, by the depression in trade and also by the coal dispute, when services had to be materially decreased. These two factors accounted in a large measure for the decrease of 47,989,531 in the number of passengers carried in 1921 (172,229,560), as compared with 1920. In spite of the adverse conditions of 1921 and the fact that the alterations in fares in February last was the third increase in a little over two and a half years, the receipts show an increase of £105,006 over 1920. During the year £174,002 was spent on permanent way renewals, and £31,259 on rolling stock, buildings, etc. The report states that the motor omnibuses having in a large measure served the purpose for which they were introduced on a number of routes, *viz.*, to assist the depleted tramcar rolling stock in carrying the vast number of passengers during 1919 and 1920, have been withdrawn from these routes and are now used only to connect up the outlying suburbs and to meet extraordinary traffic requirements. The Committee have approved the introduction of an improved type of car designed by the general manager, Mr. P. Priestly, and some new cars of this type are now in service, while 16 of the older type have been remodelled. The total operating costs per car mile were 23.398d., while the earnings per car mile were 27.477d. The average fare per passenger was 2.128d.

CONTRACTS.

Bradford Tramways Committee have decided to purchase 12 pairs of manganese steel points from Hadfield's, Ltd.

Blackpool Tramways Committee have accepted the tender of Tilling-Stevens Motors, Ltd., for the supply of a double-deck omnibus for the Thornton-Cleveleys service.

New Trucks for Edinburgh.—The Edinburgh Corporation Tramways Committee have placed an order with the Brush Electrical Engineering Company, Ltd., for 110 Peckham patent pendulum geared trucks. When these have been delivered, there will be over 160 Peckham trucks of this type in service in Edinburgh.

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PERSONAL.

Sir Sam Fay has accepted the presidency of the Institute of Transport for the twelve months commencing September next, in succession to Sir Henry Maybury, Director-General, Roads Department, Ministry of Transport.

BUSINESS NOTES.

The Hoffmann Manufacturing Company, Ltd., have removed their London office from 59, New Oxford Street, to 8, Bedford Square, W.C.1. (The telephone number and telegraphic address remain as before, *viz.*, 529 Museum, and "Hoffmannly, Westcent.") Messrs. Hoffmann inform us that stocks of their bearings are always carried, an arrangement which is a convenience to those requiring a bearing quickly.

Local Development and Light Railway Company, Ltd.—This company was registered on May 8 as a private company with a nominal capital of £100,000 in £1 shares. The registered office is 9, Victoria Street, S.W. The objects are: To carry on the business of proprietors of light railways and tramways, lorries, omnibuses and motor and other vehicles, road and rail transport, carriers of passengers and goods, manufacturers of and dealers in rolling stock, carriages, trucks, lorries, locomotives, engines and machinery, etc. The signatories to the memorandum of association are:—A. Gibb, 9, Victoria Street, London, S.W.; R. Blake, Old Mill House, Cobham, Surrey. The signatories are to appoint the first directors. Qualifications, 100 ordinary shares. Remuneration (except managing director), £1,000 each per annum, free of income tax.

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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	May 17	1,669	3,523	+ 1,854	50½	176,249	— 11,314
" Motor Buses	" 17	445	191	— 254	50½	11,075	+ 8,529
Ayr Corporation ..	" 20	534	452	— 82	1	452	— 82
Barrow Corporation ..	" 20	1,161	548	— 613	7	4,180	— 2,159
Belfast City	" 19	13,204	12,124	— 1,080	7	85,486	— 5,671
Birkenhead Corporation	" 21	2,645	2,560	— 85	7½	18,444	— 242
" Motor Buses	" 21	975	740	— 235	7½	4,976	+ 318
Birmingham Corporat'n	" 13	29,479	29,275	— 204	6	176,472	— 16,830
" Motor Buses	" 13	2,087	1,923	— 164	6	10,971	— 1,993
Blackburn Corporation	" 17	1,530	2,399	+ 869	7½	18,039	+ 1,160
Bradford Corporation..	" 20	14,706	14,441	— 265	8	101,260	+ 38
Burnley Corporation ..	" 20	2,450	3,216	+ 766	..	..	..
Burton-on-Trent Corp.	.. 21	646	540	— 106	7	3,958	— 633
Bury Corporation ..	" 21	2,502	2,578	+ 76	7½	18,173	— 454
Chatham & District ..	" 18	1,816	1,696	— 120	20	30,169	— 2,539
Chesterfield Corporat'n.	" 15	1,467	1,218	— 249	6	8,208	— 831
Derby Corporation ..	" 23	2,320	2,119	— 201	7	15,183	— 970
Dundee City ..	" 15	3,368	2,992	— 376	52	163,069	+ 1,410
East Ham Corporation	" 20	2,453	2,168	— 285	7½	15,494	+ 234
Edinburgh Corp. Trys.	" 15	..	14,891	..	52	646,416	— 45,792
" Motor Buses	" 15	..	4,398	..	52	182,953	..
Glasgow Corporation ..	" 20	49,844	44,636	— 5,208	50½	2,275,726	— 32,748
Glossop (U.E. Sup. Co.)	" 20	246	215	— 31	20	4,552	— 245
Halifax Corporation ..	" 16	4,970	4,149	— 821	6½	27,988	— 615
" Motor Buses	" 16	139	54	— 85	6½	379	— 355
" Railless Cars	" 16	..	60	..	6½	384	...
Huddersfield Corporatn.	" 20	7,362	5,258	— 2,104	8	42,369	— 3,342
Ilford U.D. Council ..	" 20	1,832	1,502	— 330	7½	10,816	— 182
Ipswich Corporation ...	" 20	849	803	— 46	7	5,733	— 75
Isle of Thanet ..	" 17	1,149	789	— 360	32½	21,101	+ 560
Kilmarnock Corporat'n	" 20	343	260	— 83	3	260	— 83
Leicester Corporation..	" 20	4,058	7,896	+ 3,838	20	145,175	+ 22,075
Liverpool Corporation	" 20	27,276	29,688	+ 2,412	20	577,878	+ 26,196
London County Ccl. ..	" 24	104,052	99,954	— 4,098	7½	729,185	— 64,166
Maidstone Corporation	" 18	500	450	— 50	6½	3,499	— 104
Manchester Corp. ..	" 20	45,167	35,976	— 9,191	7	264,813	— 18,597
Newcastle-on-T. Corp.	" 20	11,117	9,872	— 1,245	7	70,766	— 6,968
Nottingham Corp.	" 18	3,503	7,665	+ 4,162	7	52,900	+ 10,513
Oldham Corporation ...	" 21	5,567	4,597	— 970	8	38,021	— 2,077
Preston Corporation ...	" 17	2,236	1,761	— 475	6½	12,078	— 1,011
" Motor Buses	" 17	..	125	..	6½	870	..
Reading Corporation ...	" 18	1,700	1,529	— 171	7	10,632	— 13
" Motor Buses	" 18	498	317	— 181	7	2,291	— 2
Rotherham Corporation	" 22	2,227	2,119	— 108	7	15,026	+ 214
Salford Corporation ..	" 21	14,034	10,807	— 3,227	7½	76,015	— 6,470
Sheffield Corporation..	" 21	21,995	18,310	— 3,685	7½	132,307	— 8,176
Southampton Corp. ..	" 17	2,650	3,038	+ 388	7	20,339	+ 1,680
" Motor Buses	" 17	413	100	— 313	7	683	— 933
Southend-on-Sea Corp.	" 10	1,236	2,257	+ 1,021	6	13,012	+ 3,402
South Shields Corp. ..	" 20	1,675	1,649	— 26	7	11,960	+ 1,118
St. Helens Corporation	" 16	2,037	1,607	— 430	7	10,446	— 1,312
Sunderland Corp. ..	" 21	2,754	2,474	— 280	7	17,753	+ 141
Swindon Corporation..	" 17	482	350	— 132	6½	2,412	— 319
Tyneside Trys., Trds...	" 10	1,064	814	— 250	19	15,342	— 6,966
Wallasey Corp. ..	" 20	3,123	2,532	— 591	7½	18,331	— 1,361
" Motor Buses	" 20	310	240	— 70	7½	1,628	— 42
Walsall Corporation ..	" 20	1,956	1,555	— 401	7	11,838	— 565
" Motor Buses	" 20	1,297	826	— 471	7	6,611	— 309
Walthamstow U.D.C....	" 20	3,044	2,018	— 1,026	7½	13,622	— 1,939
Warrington Corp. ..	" 18	898	923	+ 25	7	6,840	— 270
West Ham Corp. ..	" 18	6,345	5,688	— 657	6½	39,672	— 1,918
Wolverhampton Corp.	" 24	2,252	2,125	— 127	8	16,992	— 1,567
" Motor Buses	" 24	665	625	— 40	8	5,105	+ 49

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1921.	1922.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	May 20	£82,017	88,632	20	£1,684,252	+ 72,448
Ballarat & Ben. (4 wks.)	Mar. 26	4,935	5,244	52	60,698	+ 3,525
Brazilian Traction (Mrs)	Mar.	13,102,000	15,238,000	13	44,743,000	+ 6,825,000
Brisbane	April	47,750	48,700	17	192,590	+ 9,055
British Columbia $	Mar.	867,083	849,680	39	7,771,665	+ 140,144
Buenos Aires Lacrose ..	April	60,238	57,619	44	579,438	+ 8,486
Burmah Tr. & Lght. Rs.	April	50,159	58,631	39	522,054	+ 63,796
Calcutta .. Rs.	May 20	82,767	106,621	20	2,127,248	+ 713,755
Cape Town	April	27,662	28,657	..		..
Carthagena & Herrerias	April	2,329	2,991	17	10,984	— 287
Cordoba	Mar.	21,717	25,382	52	277,368	+ 39,922
East India	April	4,560	4,065	39	37,082	— 905
Kalgoorlie ..	Feb.	* 316	2,031	8	4,211	+ 1,747
La Plata . ..	Mar.	* 3,403	7,067	13	20,109	+ 9,471
Madras (2 weeks) Rs.	May 15	* 51,072	48,663	19	444,842	+ 148,890
Manila .. .. $	Mar.	298,317	284,576	13	903,829	— 22,255
Montevideo	April	46,189	47,960	26	279,419	— 7,458
Para	April	22,289	23,061	21	112,507	— 1,000
Pernambuco	May 21	3,515	3,406	20½	72,208	— 15,078
Port Elizabeth	April	7,082	6,892	..	..	..
Rangoon .. Rs.	Mar.	158,121	150,500	13	418,933	+ 17,536
Shanghai .. $	April	157,500	184,560	17	720,217	+ 94,478
Singapore .. $	April 1	13,268	13,300	13	192,337	+ 36,087
Winnipeg .. $	Mar.	495,208	464,900	13	1,436,334	— 25,228

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

Common Fund Companies.		
Metropolitan District Rly. Co. ..	Week ending May 20, 1922 ..	£240,342
London Electric Rly. Co.	Corresponding week last year ..	267,349
City & South London Rly. Co. ..	Decrease	27,007
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	4,361,722
London General Omnibus Co., Ltd.	Corresponding period last year ..	4,664,320
	Decrease	302,598

London & Suburban Traction Group		
Metropolitan Elec. Tramways, Ltd.	Week ending May 20, 1922 ..	£53,947
London United Tramways, Ltd.	Corresponding week last year ..	64,470
South Met. Elec. Tr. & Ltg. Co., Ltd.	Decrease	10,523
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	938,575
	Corresponding period last year ..	1,041,221
	Decrease	102,646

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending May 20, 1922 ...	£32,312	£3,612	£35,924
Total Receipts (20 weeks) ...	656,603	74,985	731,588
MERSEY RAILWAY			
Week ending May 20, 1922 ...	—	—	£4,005
Total Receipts (20 weeks) ...	—	—	92,323

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THE
Tramway AND Railway World
FOUNDED IN 1892.

OFFICES:—AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.2.

Telephone No.: GERRARD 2948.
Telegraphic Address: "TRAMIGRO, ESTRAND, LONDON."

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THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

LONDON, JUNE 3, 1922.

THE CONDUCTOR AND HIS DUTIES.

The appeal made in the House of Lords this week by a Glasgow man in respect of an incident on a Corporation tramcar raises an important issue. Appellant, a Mr. Percy, tendered as his fare a penny which was marked, though not defaced. It was refused by the conductor, but Mr. Percy declined to offer another coin, and after an inspector had been called he was given into custody and marched to the police station. Here he was charged with not paying his fare and with tendering a defaced coin. After being detained for ten minutes he was allowed to go and was afterwards informed that the charge was withdrawn. Mr. Percy then sued the Corporation for damages for "wrongous detention" and although the Lord Ordinary allowed the case to proceed for trial by jury, his interlocutor was recalled by the First Division of the Court of Session. This Court dismissed the action on the ground that pursuer had "averred himself out of court." In other words, he had averred that the Corporation's servants, who were empowered to arrest only passengers whose names and addresses were unknown to them, had exceeded their duty by giving him into custody when his name and address were in their possession. The House of Lords have now decided that the tramway officials were agents acting within the scope of their authority, and that appellant was entitled to have the case tried out. Though we are not in any way concerned with the merits or demerits of this particular action, it is to the advantage of the general public that Mr. Percy should have gone to so much trouble to have his claim thoroughly tested. The principles involved are highly important to all who use or operate public service vehicles. In the first place, the case serves to emphasise the urgent necessity for every tramway conductor and inspector to be fully conversant with the legal aspect of his duties in relation to passengers. Each must know clearly what he has a right to do in certain circumstances and where he must draw the line. It is, indeed, such a common occurrence for a conductor to encounter peculiar situations that he needs to be something of a lawyer in his particular sphere. But even a meticulous regard for mere legal correctitude should not be his sole aim. He should always endeavour to "meet" the passenger as far as he possibly can, remembering that the passenger is his customer, and that he must receive first consideration. In the case of a municipally-owned undertaking especially should the traveller receive every courtesy, representing as he does the body of ratepayers who own the system. Where there is any doubt about some little point, nothing is lost by conceding it to the passenger. Viewed in this light, the action of the employees on the car appears to have been unduly brusque, and it is surprising that such an incident could have happened on a system so large and so well directed as that of Glasgow. For a conductor to leave behind a good impression is quite as important as scoring a point, so to speak. Once a person has a grievance—real or imaginary—he may be expected to use the tramway as seldom as possible, even if he does not ignore it entirely.

BIRMINGHAM TRAMWAYS WAR MEMORIAL

IMPRESSIVE UNVEILING CEREMONY.

The memorial erected by Birmingham Corporation tramway employees to their 236 comrades who fell in the war was unveiled on Sunday last. The memorial (as was mentioned in our issue of last week) is an imposing monument erected on the Tramway Stadium, King's Heath. It is 20 ft. high, and is enclosed in a formal garden fenced off from the playing field by a beech hedge Special cars conveyed some 2,000 tramwaymen, their wives and families to the Stadium. Wearing their medals and ribbons, they formed up in companies, and, headed by the Tramways Band, marched to the site of the memorial. The procession included the Bishop of Birmingham (Dr. Russell Wakefield), the Lord Mayor (Alderman David Davis), the Town Clerk (Mr. F. H. C. Wiltshire), the chairman (Councillor F. Smith), and members of the Tramways Committee, the general manager (Mr. Alfred Baker), and the principal officers of the department.

Mr. Baker, speaking prior to the unveiling, said that on the outbreak of war no body of men answered to the call of King and country with greater enthusiasm than the Birmingham tramwaymen. In less than a month 600 men, or 20 per cent. of the total number of the employees of the department voluntarily joined up. Throughout the course of the war the department supplied to the Forces 1,800 men. The whole cost of the memorial had been contributed by the men themselves, without any outside assistance whatever, from the Corporation or the Tramways Committee.

After the Lord Mayor had delivered a brief address, Lieutenant F. Clarke, M.M., one of the employees of the tramways who gained a commission during the war, unveiled the memorial, which was dedicated by the Bishop of Birmingham. All the cars and omnibuses in service in the city halted for two minutes during the ceremony.

LONDON UNDERGROUND EXTENSIONS

LORD ASHFIELD'S MEMORANDUM.

A memorandum by Lord Ashfield with reference to the proposed London Underground extensions to be carried out under Treasury guarantee with respect to the capital was circulated on May 26 to the London Members of Parliament. After referring to the original proposals which were declined by the Government in November last, Lord Ashfield gives a summary of the revised scheme with which it has been decided to proceed. This includes (i) the Edgware Extension Railway from Golders Green to Hendon and Edgware, a distance of 4¼ miles, with five stations, and (ii) the connecting railways between Camden Town and Euston, which will enable through services to be worked from the northern branches of the Hampstead line over the City and South London Railway to the Bank and Clapham Common. Provision is also made for station improvements, such as the provision of escalators, and additions to the power plant at Lots Road power station. The City and South London Company's tunnels will be enlarged and improved to conform with the standard of the other tube railways and new rolling stock will be provided. Particulars are given of the Treasury guarantee, and the memorandum concludes with the statement that contracts have now been placed for a large part of the work, and operations will commence almost immediately. The whole of the plant equipment, with the one exception of certain parts of the escalators, will be manufactured in this country.

Railless Traction at Bradford.—The text was recently issued of the Bill promoted by Bradford Corporation to confirm Provisional Orders of the Transport Ministry for the alteration of local Acts authorising the Corporation to run railless trolley cars on a number of routes at present served by tramways and on other routes. Among other provisions, the Bill authorises a loan of £10,000 for the erection of a repair depot, for the establishment and equipment of the trolley vehicles and for tramway purposes, in addition to such sums as the Transport Minister may from time to time sanction.

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TRAMCAR CONDUCTOR'S DUTY.

IMPORTANT APPEAL TO THE HOUSE OF LORDS.

A case of much interest to tramway managements was decided in the Appeal Court of the House of Lords on May 26. Lord Haldane, Lord Cave, Lord Finlay, Lord Dunedin and Lord Wrenbury heard the case. The appellant, John Percy, a printing machine hand, of Glasgow, originally brought the action against the respondents, the Corporation of Glasgow, for damages for false imprisonment, or, as it is called in Scotland, "wrongous detention," arising out of an incident in a tramcar. The Lord Ordinary, before whom the action came in the Court of Session, held that the case, as averred by Mr. Percy, was relevant, and he approved of an issue for the trial of a cause. The First Division of the Court of Session recalled the interlocutor of the Lord Ordinary, and dismissed the action. Against this judgment Mr. Percy now appealed to the House of Lords.

Appellant's case was that in July, 1920, when a passenger on a Glasgow Corporation tramcar, he tendered a penny, said to be slightly marked but not defaced, in payment of fare. The conductor refused to accept the coin, and demanded another, which the man refused to give. The conductor then called a tramway inspector, who repeated the demand for another penny, with the same result; and on Percy insisting that the coin was good, the inspector and conductor called a police constable, and, as Percy alleged, gave him into custody on the charge of refusing to pay his fare, notwithstanding that he gave his name and address to those officials of the Corporation. Mr.sPercy was then, he said, removed from the car by the constable and taken along the public street to the police station. There he was detained for about ten minutes, and then allowed to go on the undertaking to return for further procedure next morning. On the following day he attended at the Police Court, where he was informed that the matter was finished. No proceedings were instituted against him. In these circumstances Mr. Percy raised an action for damages against the Corporation, as being legally responsible for the wrong to which he alleged he was subject at the hands of their servants, claiming £500 and £100 expenses.

CORPORATION'S CASE.

The Corporation contended that under their by-laws it was a condition precedent to the exercise by the tramway officer of the power of seizing and detaining a passenger that the name or address of the passenger should be unknown to the officer or servant, and on the showing of Mr. Percy himself, the conductor and inspector acted outside the scope of their employment and authority.

Lord Haldane, in giving judgment, said he was unable to agree with the First Division Court which dismissed the action on the question of relevancy simply. He was of opinion that in the circumstances alleged, the employees were agents "acting within the scope of their agency." He thought, therefore, that the pursuer had on this footing the right to have issues of fact, which appeared to have been relevantly stated, tried out. If that be true the interlocutor of the First Division should be recalled and that of the Lord Ordinary restored. So far as the appeal was concerned, the appellant, having sued *in forma pauperis*, was not entitled to more costs than were usually allowed in such cases. The other Lords gave judgment to the same effect, and the issue will therefore be re-tried.

L.C.C. TRAMWAY MATTERS.

INCREASED ESTIMATE FOR TRAMWAY CONSTRUCTION.

At the meeting of the London County Council on Tuesday, the recommendation of the Highways Committee for a supplemental estimate of £25,000 for the construction of the High Street, Wandsworth, and East Hill tramways was approved. Estimates amounting in all to £52,040 for the underground conduit system had previously been accepted, and the Highways Committee stated that while the total expenditure for the work was not finally known, it was anticipated that the amount of the original estimates would be exceeded by about £25,000. The Finance Committee, in commenting on the recommendation, remarked that the increased cost of the construction from £52,040 to £77,040, could not but have a serious effect on the financial results of the working of the line. In 1919 it was estimated that this would provide an average surplus of £2,977 a year, and, having regard to the largely increased capital cost, amounting to nearly 50 per cent., it appeared doubtful whether the surplus estimated in 1919 might not be converted into a deficiency.

REPORT ON LONDON TRAFFIC ORGANISATION.

The Highways Committee have made arrangements for the publication of 10,000 copies of their report on London traffic organisation, which was set out in the minutes of the Council of May 9. It is proposed that not only London Members of Parliament, but also members of constituencies outside London, which are generally regarded as comprised in the Greater London area, should be furnished with a copy of the report, as well as the principal local authorities.

HAMMERSMITH LINES OF THE LONDON UNITED TRAMWAYS.

Certain questions having arisen with regard to the cables, ducts, and manholes at the generating station at Chiswick, which is being purchased by the Council, together with the Hammersmith lines of the London United Tramways, Ltd., negotiations are now proceeding with the company on the subject. In the meantime, it had been agreed that the running arrangements should commence on May 2, and that the Council should pay interest at 1 per cent. above the Bank rate on the purchase money from that date to the day of actual completion, which is expected to take place within a few weeks. The cost involved is estimated at about £1,000.

DOUBLING OF TRAMWAY TRACK IN HIGH STREET, WOOLWICH.

The Council have undertaken to widen High Street, Woolwich, at Nos. 17 to 21, in order that the tramway track at that part may be doubled. The cost of the work is estimated not to exceed £5,000, and the Finance Committee approved this. The amount is chargeable to capital (25 years) account.

CENTRAL REPAIR DEPOT—REINFORCED CONCRETE FLOOR.

The following tenders for the construction of a reinforced concrete floor for the final section of the central repair depot, together with repair works to the traverser pits, were received:

Tenderer.	Reinforced Concrete Floor.			Repair works to Traverser pits.		
	£	s.	d.	£	s.	d.
J. Garrett and Son	12,398	0	0	1,283	0	0
D. G. Somerville and Co., Ltd.	12,413	6	11	1,644	7	6
Trollope and Colls, Ltd.	14,127	0	0	1.938	0	0
J. and W. Stewart	14,457	9	11	1,599	1	3
Davidson and Sykes, Ltd.	15,157	11	4	1,309	11	0
P. and W. Anderson, Ltd.	16,261	0	0	2,005	0	0
Campbell, Kenyon and Co.	16,627	6	8	1,951	9	6

The tenders are for a scheme prepared by the architect for a concrete floor with complete reinforcement. The tender of Messrs. J. Garrett & Son, amounting to £13,681, was accepted.

INVITATION OF TENDERS FROM SELECTED FIRMS.

The Highways Committee recommended that invitations to selected firms for tenders for (i) the erection of a trailer car shed on the site of Aspen House, Brixton Hill, (ii) the welding of rail joints in Lea Bridge Road, and (iii) repairs to the wood paving at Blackwall tunnel, be authorised.

The Highways Committee were authorised during the Whitsuntide recess to open any tenders involving capital expenditure over £1,000, which were received for the supply of materials, etc.

The Council has appointed Mr. Percival H. Reed, a member of the Highways Committee, in place of Captain O. Wakeman, who recently resigned. Mr. A. N. Scott has resigned his membership of the Highways Committee.

MISCELLANEOUS NEWS AND NOTES.

Price of Power.—Radcliffe Council have agreed to reduce the price of electric energy supplied to the tramways from 1.9d. to 1.7d. per unit.

The M.E.A. Convention.—The Incorporated Municipal Electrical Association's annual convention will be held at Wolverhampton from June 20 to 23.

Electrification in East Indies.—The Dutch East India authorities have decided to electrify the whole railway system. Direct current at 1,500 volts is to be used.

New Double Track at Leicester.—Leicester Tramways Committee propose to construct a double track from the Groby Road and Abbey Park Road to the car sheds.

Railless System Recommended at Hartlepool.—The West Hartlepool Tramways Committee, has, it is understood, recommended the adoption of railless trolley cars on the Foggy Fureye route.

Ayr Town Council are purchasing from Manchester Corporation five single-deck cars at £120 each. The carriage will be £30 per car, and a considerable sum will be required to adapt the cars to local conditions.

Bees Stop a Tramway Car.—Maidstone Corporation tramways was stopped on Tuesday by a swarm of bees settling on the trolley pole of a car passing through the main street. A local bee-keeper eventually removed the swarm.

Plymouth Tramways Extension.—A new double track, six furlongs in length, of Plymouth Corporation tramways from Pennycomequick to Milehouse, has been inspected by Major Mount, R.E., on behalf of the Transport Ministry.

Insurance of Edinburgh Electric Cars.—It is reported that the rates quoted for third party insurance in connection with the new Edinburgh electric tramcars are equivalent to only half the rates demanded for motor omnibuses or cable cars.

The Nottinghamshire and Derbyshire Tramways Bill, which seeks power to construct additional tramways to link up Heanor, Nottingham and Ilkeston, has been passed by the Unopposed Bills Committee of the House of Lords for third reading.

Dublin Men's Sunday Duty.—Following the strike of employees of Dublin United Tramways on Sunday, May 21, an agreement has been reached between the company and the men, whereby the latter now work seven housr on Sundays.

South Shields Extensions Approved.—Major Hall, of the Ministry of Transport, on Tuesday inspected and approved the South Shields Corporation tramway extensions at Mile End Road, and Sunderland Road, and the light railway from the latter to the housing estate at Cleadon Park.

Gallantry to Save Belfast Car.—Belfast Tramways Committee have recommended the Council to present £50 to a flower-seller who saved a tramcar from destruction by his prompt action in rendering innocuous a bomb which was found on the car on its arrival at Castle Junction.

Newcastle Track Improvement.—The diversion of the track on the Scotswood-Throckley route of Newcastle Corporation tramways, in order to avoid the gradients at the two bridges crossing the Newburn branch of the North-Eastern Railway, has been completed. Cars used the route for the first time on Tuesday.

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New Plant for Stalybridge Tramways Board.—Stalybridge, Hyde, Mossley and Dukinfield Tramways Board have decided to apply to the Electricity Commissioners for sanction to borrow £97,300 for the installation of new plant, in order to cope with the demands for electricity for power purposes.

Reduced Fares at Birkenhead.—A reduction has been made in certain fares on the Birkenhead Corporation tramways which brings the scale to the same level as obtained between May, 1919, and August last. A halfpenny is deducted from several long-distance stages, and the length of some of the cheaper stages is increased to what it was originally.

Cheap Mid-day Fares at Ipswich.—Ipswich Electricity Supply and Tramways Committee have resolved to inaugurate cheap fares between the hours of 10 a.m. and 12 noon, and 2.30 p.m. and 4.30 p.m on all week-days excepting Saturdays, Sundays and Bank Holidays. Three halfpence for an adult and 1d. for a child will be charged from a central point to any terminus, or *vica versa*.

Tribute to Cork Tramway Engineers.—Presiding at the annual meeting of the Cork Electric Tramways and Lighting Company, Mr. A. R. Monks (chairman), said workmen would not go out during curfew hours to execute repairs on any pretext whatever, and on numerous occasions the system was enabled to carry on because their engineers at considerable risk went out and did the work.

Electrical Workers' Wages.—Wages in the electrical contracting industry are to be reduced, owing to the fall in the cost of living, 22 per cent. under the four-monthly adjustment. The previous reduction was 16 per cent. The effect will be that from the second pay-day in June the following rates of pay will apply until the beginning of October :—Grade A 1s. 11½d., Grade B 1s. 9d., Grade C 1s. 7½d., Grade D 1s. 6d.

East Ham Ratepayers and Fares.—When members of East Ham Ratepayers' Association paid a visit to the tramways depot and the electricity station, Councillor H. I. Rolf (chairman of the Tramways Committee), in the course of an address, complained that ratepayers were the very people who tried to dodge paying their fares. "We are continually getting complaints," he added. "Just lately we have suspended conductors, and have even discharged one man in connection with that very thing. That policy will be carried out to the bitter end. Men should do justice to a service in which they are employed. It is the duty of ratepayers to see that conductors collect the fares."

London Street Accidents.—A return of street accidents in London during January, February and March compiled by the Metropolitan Police includes the following figures for mechanically-propelled vehicles :—

Type of Vehicle.	Number of Persons Killed.	Number of Accidents to Persons or Property.
Omnibuses	5	634
Tramcars	11	625
Cabs	6	701
Private cars	48	2,615
Motor cycles	7	488
Trade and commercial	43	2,702
Traction engines	...	7

The figures in the first column are included in the second column. Adding to these the casualties in respect of horse-drawn vehicles, the totals under the respective headings are 130 and 10,980.

PERSONAL.

Sir Eric Geddes has been elected to the Board of the Dunlop Rubber Company.

Mr. Edward H. Fleming, who for the past fourteen years has been associated with the Anti-Attrition Co., Ltd., has resigned his position with that company.

Sir William Noble, who recently retired from the position of engineer-in-chief to the Post Office, has accepted a seat on the Board of the General Electric Company.

Mr. G. Hammond Etherton, who has been town clerk of Liverpool for the past eighteen months, was on Thursday appointed clerk to the Lancashire County Council at a salary of £5,000 a year. His salary at Liverpool was £3,500.

Colonel R. R. Greene, general manager of Wallasey Corporation tramways, has reached the retiring age of members of the Corporation staff, but the Finance Committee are recommending the Council that he be asked to retain his position until December 31 next.

Mr. Thomas W. How, M.I.Mech.E., F.C.I.S., after 25 years' service as Managing Director and Secretary of the Empire Roller Bearings Co., Ltd., is shortly resigning that position, in order to resume his general practice as a consulting engineer and as an expert in roller and ball bearings, at 13, Victoria Street, Westminster, S.W.1.

Mr. A. J. Abraham, tramways manager and electrical engineer of the Aberdare Urban District Council, has resigned his position in order to accept another position. Mr. Abraham's salary was £460, plus bonus, making in all £700 a year. The Council have accepted his resignation with regret and are advertising for a manager at a basic salary of £450 per annum, plus bonus.

Major T. F. Purves, who has succeeded Sir William Noble as engineer-in-chief to the Post Office, anticipates that in ten years the number of telephones in use will approach 4,000,000 and that all overhead wires and cables in our large towns will be cleared away and the circuits accommodated underground. He expects automatic exchanges to have by that time become the standard system in most of our provincial towns and that two-thirds of the London telephone service will be equipped with the automatic system.

We regret to record the death of **Mr. John Martin**, the head of the Alternating Department of the British Thomson-Houston Company. Mr. Martin died on May 23 at his residence in Rugby. On leaving Glasgow University, where he took the degree of B.Sc., he entered the works of the British Electrical Plant Company at Alloa, and in 1903 joined the British Thomson-Houston Company at Rugby.

FINANCIAL.

Blackpool Corporation Tramways.—There was a disposable balance of £6,142 on the past year's working, as compared with £144 for the previous year. The total receipts were £261,989, and the aggregate working expenses £204,882. To the balance stated must be added £144, brought forward from the previous year, and, after deducting £50 deficiency on the omnibuses, the net balance is £6,236.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended May 31 amounted to £98,672, a decrease of £3,952 compared with the corresponding period of last year. The route length was 160.73 miles, as compared with 152.52 a year ago. From April 1 (the commencement of the financial year) to May 31 (8⅐ weeks), the total receipts were £827,871, a decrease of £68,103 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended May 20 give total receipts of £364,753, or £25,811 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £187 4s. 10d. per mile of single track, and last year at the rate of £200 9s. 10d., thus showing a decrease for the week of £13 5s. per mile open.

Anglo-Argentine Tramways Co.—At the 38th annual meeting of the Anglo-Argentine Tramways Co., held in London on Wednesday, Sir George A. Touche, Bt. (the chairman), said that the total receipts for the year were less by £135,000 and the total expenses more by £107,000. The position of the company was not satisfactory. The business should be self-supporting on a commercial basis. The City of Buenos Ayres was supplied with the finest tramway service in the world. Visitors were astonished at the development of tramway facilities. Yet those who supplied the service were receiving no return on a large part of their capital.

Shanghai Electric Construction Co.—The sixteenth annual meeting was held in London on May 31. Sir Alfred Dent, K.C.M.G. (the chairman), who presided, said the results of the past year might be regarded as satisfactory, inasmuch as the operating profit, reckoned on the usual basis of 2s. to the dollar, was larger than ever before. After providing for all expenses, there was a disposable balance of £122,361. Mr. Donald McColl, the company's general manager, who is now in London, said the fact that their volume of traffic had increased from 11¾ millions of passengers in 1909 to 120 millions in 1921, with only 1¼ miles of additional route, and was increasing further to seven million passengers per mile of route per annum, was evidence of the congestion and the urgency of extensions. The directors recommended a final dividend of 8 per cent., less income tax, making 20 per cent. for the year.

British Electric Traction Company.—The report for the year ended March 31, 1922, states that the gross profit amounted to £262,895, compared with £264,772 in the previous year. Deducting general expenses, £44,401, there remains a net profit of £218,493 (against £220,197). Including the sum brought forward (£177,318), and after charging debenture stock interest (£84,451), and placing £14,676 to reserve, there is a balance of £296,684. This sum the directors propose should be applied as follows: Dividend of 6 per cent. on the cumulative participating preference stock, on which 3 per cent. has already been paid, and a dividend of 4½ per cent. for the year on the ordinary stock, leaving £194,237 to be carried to the next account, subject to Corporation profits tax for the years ended March 31, 1920, 1921, and 1922. The reserve now stands at £520,000.

British Thomson-Houston Company, Ltd.—The 27th annual meeting was held in London on Tuesday, Mr. H. C. Levis (the chairman and managing director) presiding. Mr. Levis said he thought the report would be considered very satisfactory. The volume of unfilled orders on hand at the end of 1920 was such that, notwithstanding the fact that during 1921 the orders received were less in volume than for the previous year, the output for 1921—that was to say, the amount billed to customers—was the greatest in the history of the company. In spite of the general depression throughout the country, the volume of orders received by the company this year to date was over 37 per cent. in excess of the orders received for the corresponding period of 1921. The company now had on hand orders to the value of over £2,250,000. It might be well for him to repeat what he said a year ago, relative to inquiries, *i.e.*, that the volume was very large, and while the proportion which had resulted in orders was not as great as in 1920, nevertheless there was still a great demand for electrical machinery which must be satisfied sooner or later, and from which they confidently expected to get their fair share. In the latter part of the year under review, it was deemed wise to make provision to liquidate the floating debt of the company. An issue of £3,000,000 of debenture stock was authorised, and £1,500,000 par value was issued on satisfactory terms. The issue was largely over-subscribed, and it was satis-

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factory to note that this stock stood at a substantial premium to-day. During the year the expenditure on factories was over £450,000, principally in connection with the new Birmingham factory, the new glass works at Chesterfield for their electric lamp business, and extensions to the Rugby plant, all of which would be completed during the current year. After a brief allusion to industrial disputes, Mr. Levis said he was glad to be able to state that the personal relations between the firm's own employees and the management were satisfactory.

CONTRACTS.

The Edinburgh Town Council have accepted the following tenders:—Brush Electrical Engineering Co., 110 Peckham patent pendulum gear trucks at £13,310; Dorman, Long & Co., tramway rails and fishplates at £13,456.

The Bristol Tramways and Carriage Co., Ltd., have received from the Yorkshire (West Riding) Electric Tramways Co., Ltd., a repeat order for ten "Bristol" single-deck omnibuses, similar to those recently supplied to that company.

Bournemouth Tramways Reconstruction.—The reconstruction of a portion of these tramways, now nearly completed, comprises a total of about 12 miles. The work has been carried out under the instructions of Mr. I. Bulfin, general manager of the Bournemouth Corporation tramways, by the well-known firm of tramway and general contractors, William Griffiths and Co., Ltd., of Hamilton House, London. Included in their contract was a considerable area of wood paving in the breasts of the roads, and this was carried out under the instructions of the borough engineer, Mr. F. P. Dolamore. Messrs. William Griffiths & Company also reconstructed a large section of the tramways just previous to the outbreak of the war.

The Electric Construction Co., Ltd.—The registered offices of this company, as from June 6, will be at Ingersoll House, 9, Kingsway, London, W.C.2.

POSITIONS VACANT.

THE URBAN DISTRICT COUNCIL OF ABERDARE.

Tramways Manager and Electrical Engineer.

The Aberdare Urban District Council invite applications for the appointment of Tramways Manager and Electrical Engineer, at a salary of £450, plus current bonus under Civil Service Award No. 102, amounting at the present time to £239 7s. 7d

Candidates, in addition to tramway and engineering experience, must have knowledge of destructor plant and steam raising by refuse.

Applications, accompanied by copies of three recent testimonials, to be sent to the undersigned not later than June 26, 1922.

W. R. MORGAN,
Clerk to the Council.

Town Hall, Aberdare.
June 1, 1922.

TENDER INVITED.

THE DUBLIN UNITED TRAMWAYS COMPANY (1896), LIMITED.

The Company is prepared to receive Tenders for the supply of General Stores, including Car Fittings, Iron, Steel, Castings, Paints, Glass, Brushes, Ironmongery, Electrical Supplies, etc., for six months ending December 31, 1922.

Forms of Tender (price 2s. 6d. each), conditions, and all information can be obtained at the General Manager's Office, 9, Upper Sackville Street.

Tenders sealed, marked on the outside "Tenders for Stores," and addressed to the Chairman, to be lodged at this Office on or before June 12, 1922.

By order,
G. MARSHALL HARRISS,
General Manager.

9, Upper Sackville Street,
Dublin.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London,
W.C.2

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	May 24	1,722	3,588	+ 1,866	51½	179,837	— 9,447
„ Motor Buses	„ 24	606	225	— 381	51½	11,300	+ 8,148
Ayr Corporation ..	„ 27	672	772	+ 100	2	1,223	+ 16
Barrow Corporation ..	„ 27	921	597	— 324	8	4,778	— 2,484
Belfast City	„ 26	13,128	11,122	— 2,006	8	96,608	— 7,677
Birkenhead Corporation	„ 28	2,296	2,636	+ 340	8¾	21,080	+ 98
„ Motor Buses	„ 28	760	769	+ 9	8¾	5,745	+ 327
Birmingham Corporat'n	„ 20	30,355	28,784	— 1,571	7	205,256	— 18,401
„ Motor Buses	„ 20	2,902	1,891	— 1,011	7	12,862	— 3,004
Blackburn Corporation	„ 24	1,157	2,535	+ 1,378	8½	20,674	+ 2,636
Bradford Corporation..	„ 20	14,706	14,441	— 265	8	101,260	+ 38
Burnley Corporation ..	„ 27	2,607	3,304	+ 697	..	..	..
Burton-on-Trent Corp.	„ 28	561	565	+ 4	8	4,523	— 629
Bury Corporation ..	„ 28	2,176	2,615	+ 439	8½	20,788	— 15
Chatham & District ..	„ 18	1,816	1,696	— 120	20	30,169	— 2,539
Chesterfield Corporat'n.	„ 22	1,461	1,204	— 257	7	9,412	— 1,088
Derby Corporation ..	„ 27	1,614	2,229	+ 615	8	17,412	— 355
Dundee City ..	„ 24	3,526	3,074	— 452	1½	3,893	— 528
East Ham Corporation	„ 27	2,027	2,246	+ 219	8½	17,741	+ 452
Edinburgh Corp. Trys.	„ 20	11,961	9,193	— 2,768	1	9,193	— 2,768
„ Motor Buses	„ 20	3,630	2,691	— 939	1	2,691	— 939
Glasgow Corporation ..	„ 27	51,093	46,123	— 4,970	51½	2,321,849	— 38,082
Glossop (U.E. Sup. Co.)	„ 27	219	229	+ 10	21	4,781	— 235
Halifax Corporation ..	„ 23	3,910	4,394	+ 484	7½	32,382	— 131
„ Motor Buses	„ 23	109	56	— 53	7½	434	— 408
„ Railless Cars	„ 23	..	62	..	7½	446	...
Huddersfield Corporatn.	„ 27	5,355	5,446	+ 91	9	47,815	— 3,250
Ilford U.D. Council ..	„ 27	1,573	1,545	— 28	8½	12,361	— 250
Ipswich Corporation ...	„ 27	680	883	+ 203	8	6,616	+ 112
Isle of Thanet ..	„ 24	910	959	+ 49	33½	22,059	+ 609
Kilmarnock Corporat'n	„ 27	371	325	— 46	1½	585	— 129
Leicester Corporation..	„ 27	3,189	7,972	+ 4,783	21	153,147	+ 27,211
Liverpool Corporation	„ 27	26,844	30,604	+ 3,760	21	608,484	+ 29,958
London County Ccl. ..	„ 31	102,624	98,672	— 3,952	8½	827,871	— 68,103
Maidstone Corporation	„ 25	420	473	+ 53	7½	3,973	— 50
Manchester Corp. ..	„ 27	40,967	36,102	— 4,865	8	300,915	— 24,765
Newcastle-on-T. Corp.	„ 20	11,117	9,872	— 1,245	7	70,766	— 6,968
Nottingham Corp.	„ 25	2,998	7,963	+ 4,965	8	60,863	+ 15,478
Oldham Corporation ...	„ 28	4,921	4,888	— 33	9	42,909	— 2,110
Preston Corporation ...	„ 24	1,935	1,803	— 132	7½	13,881	— 1,143
„ Motor Buses	„ 24	..	125	..	7½	904	..
Reading Corporation ...	„ 25	1,393	1,622	+ 219	8	12,254	+ 214
„ Motor Buses	„ 25	388	351	— 37	8	2,642	— 39
Rotherham Corporation	„ 22	2,227	2,119	— 108	7	15,026	+ 214
Salford Corporation ..	„ 28	10,790	11,113	+ 323	8¾	87,128	— 6,306
Sheffield Corporation..	„ 28	19,069	18,865	— 204	8½	151,173	— 8,380
Southampton Corp. ..	„ 24	2,332	3,279	+ 947	8	23,618	+ 2,627
„ Motor Buses	„ 24	431	98	— 333	8	782	— 1,266
Southend-on-Sea Corp.	„ 24	1,825	2,396	+ 571	8	17,640	+ 4,177
South Shields Corp. ..	„ 27	1,610	1,692	+ 82	8	13,653	+ 1,195
St. Helens Corporation	„ 23	1,789	1,599	— 190	8	12,046	— 1,502
Sunderland Corp. ..	„ 28	2,358	2,602	+ 244	8	20,356	+ 386
Swindon Corporation..	„ 24	425	379	— 46	7½	2,791	— 365
Tyneside Trys., Trds...	„ 17	1,603	817	— 786	20	16,160	— 7,751
Wallasey Corp. ..	„ 27	2,762	2,635	— 127	8½	20,966	— 1,487
„ Motor Buses	„ 27	291	227	— 64	8½	1,856	— 110
Walsall Corporation ..	„ 27	1,552	1,564	+ 12	8	13,403	— 553
„ Motor Buses	„ 27	782	789	+ 7	8	7,400	— 303
Walthamstow U.D.C....	„ 27	2,337	2,222	— 115	8½	15,844	— 2,104
Warrington Corp. ..	„ 25	803	962	+ 159	8	7,802	— 111
West Ham Corp. ..	„ 25	5,166	5,925	+ 759	7¾	45,597	— 1,159
Wolverhampton Corp.	„ 31	2,136	2,172	+ 36	9	19,164	— 1,532
„ Motor Buses	„ 31	588	631	+ 43	9	5,737	+ 92

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1921.	1922.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	May 27	£83,290	83,995	21	£1,768,247	+ 73,153
Ballarat & Ben. (4 wks.)	Mar. 26	4,935	5,244	52	60,698	+ 3,525
Brazilian Traction (Mlrs)	April	13,562,000	15,413,000	17	60,156,000	+ 8,676,000
Brisbane	April	47,750	48,700	17	192,590	+ 9,055
British Columbia $	April	835,793	818,177	43	8,589,842	+ 122,528
Buenos Aires Lacroze ..	April	60,238	57,619	44	579,438	+ 8,486
Burmah Tr. & Lght. Rs.	April	50,159	58,631	39	522,054	+ 63,796
Calcutta .. Rs.	May 27	79,534	104,075	21	2,231,323	+ 738,296
Cape Town	April	27,662	28,657	..	..	..
Carthagena & Herrerias	April	2,329	2,991	17	10,984	— 287
Cordoba	Mar.	21,717	25,382	52	277,368	+ 39,922
East India	April	4,560	4,065	39	37,082	— 905
Kalgoorlie ..	Feb.	* 316	2,031	8	4,211	+ 1,747
La Plata ..	Mar.	* 3,403	7,067	13	20,109	+ 9,471
Madras (2 weeks) Rs.	May 15	* 51,072	48,663	19	444,842	+ 148,890
Manila .. .. $	April	279,534	286,044	17	1,189,893	— 15,816
Montevideo	April	46,189	47,960	26	279,419	— 7,458
Para	April	22,289	23,061	21	112,507	— 1,000
Pernambuco	May 21	3,515	3,406	20½	72,208	— 15,073
Port Elizabeth	April	7,082	6,892	..	..	.
Rangoon .. Rs.	Mar.	158,121	150,500	13	418,933	+ 17,536
Shanghai .. $	April	157,500	184,500	17	720,217	+ 94,478
Singapore .. $	April 8	13,249	17,019	14	209,356	+ 39,857
Winnipeg .. $	April	462,378	435,058	17	1,871,392	— 52,548

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

Common Fund Companies.		
Metropolitan District Rly. Co. ..	Week ending May 27, 1922 ..	£250,303
London Electric Rly. Co.	Corresponding week last year ..	253,827
City & South London Rly. Co. ..	Decrease	3,524
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	4,612,025
London General Omnibus Co., Ltd.	Corresponding period last year ..	4,918,147
	Decrease	306,122

London & Suburban Traction Group		
Metropolitan Elec. Tramways, Ltd.	Week ending May 27, 1922 ..	£57,628
London United Tramways, Ltd.	Corresponding week last year ..	56,455
South Met. Elec. Tr. & Ltg. Co., Ltd.	Increase	1,173
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	996,203
	Corresponding period last year ..	1,097,676
	Decrease	101,473

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending May 27, 1922 ...	£32,145	£3,438	£35,583
Total Receipts (21 weeks) ...	688,748	78,423	767,171
MERSEY RAILWAY			
Week ending May 27, 1922 ...	—	—	£3,899
Total Receipts (21 weeks) ...	—	—	96,222

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THE
Tramway AND Railway World
FOUNDED IN 1892.

OFFICES:—AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.2.

Telephone No.: GERRARD 2948.
Telegraphic Address: "TRAMIGRO, ESTRAND, LONDON."

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LONDON, JUNE 10, 1922.

A HINDRANCE TO LABOUR NEGOTIATIONS.

The remarks made by Mr. J. R. Clynes at Birmingham on Monday with reference to trade union leadership, have an important bearing on labour negotiations as they affect tramways. Mr. Clynes complained that experienced leaders in the trade unions who were not given proper authority and full confidence were weakened in their work and could never be on equal terms with spokesmen of the employers. The possession of real power would place the labour leader, he said, on a footing of greater equality to bargain with those who acted in the employers' interest, instead of being, as sometimes was the case, a mere messenger who conveyed proposals from the employers to the masses of workmen. Although Mr. Clynes made certain statements with reference to employers which cannot be substantiated, it is refreshing to find that a Labour leader of such eminence and experience has spoken with candour and commonsense on this matter. Those who have been concerned in the negotiations carried on from time to time by the National Joint Industrial Council for the tramway industry will endorse Mr. Clynes' criticism. The men who are chosen to represent the employees' side of this body clearly ought to be given full power to take definite decisions on behalf of their constituents, in the knowledge that any steps they take will automatically be endorsed. In other words, they should not be mere spokesmen with authority to make tentative bargains, but fully accredited agents with plenary powers. As matters stand, the men's representatives are obliged to submit the decisions at which they have arrived in consultation with the employers to the various trade union branches throughout the country for endorsement or otherwise, with the result that their conclusions are not unlikely to be discredited and their time and trouble wasted. There can be no satisfaction for either side in conducting negotiations which have this element of uncertainty behind them, or in formulating well-reasoned decisions that may be peremptorily rejected by those who have taken no part in the discussions. The employers' representatives come to the conference table with the assurance that those for whom they speak will stand by whatever they themselves decide, and as Mr. Clynes points out, the representatives of Labour would be placed on a stronger footing were their powers more adequate and final. It is indeed such loose methods of working that have led to the "unauthorised strikes," which from time to time serve but to discredit the trade unions, and usually end in failure for the men themselves. The rank and file probably argue that as they are the people supposed to carry out the terms of the various agreements arrived at, they are entitled to have the last word. The men would do well to remember, however, that their representatives at these joint conferences see the whole two sides of the case, are able to judge how far their claims can possibly be conceded, and when and where they must compromise. The great mass of the men scattered throughout the provinces are obviously not cognisant of, and therefore cannot appreciate, these limitations. Their wisest and best course is to entrust with adequate powers those whom they have chosen for leaders.

SCOTTISH TRAMWAY EMPLOYEES' WAGES.

PROPOSED REDUCTIONS AT EDINBURGH AND GLASGOW.

Proposed reductions in the wages of Corporation tramway employees in Edinburgh and Glasgow are meeting with opposition. On June 2 the Edinburgh employees received notification from the management that the recommendations compiled by the Scottish Tramways' Association had been adopted by the Edinburgh Corporation as from June 1. The letter further stated that the Corporation had resolved to adopt the time and a quarter rates for Sunday, instead of time and a half, on and after September 1, 1922.

The new conditions were considered by a mass meeting of the men on Saturday last. Subsequently, their Secretary (Mr. John Veitch) pointed out that at the end of last year the Scottish employers withdrew from the National Joint Industrial Council which hitherto covered England, Scotland and Wales. This had the effect of breaking up the Scottish District Joint Industrial Council. At that time the men's representatives were discussing with the District Council the revision of the March, 1919, agreement, and it was all but complete when the National Council decided to take up work. The Scottish tramway managers then refused to allow the National Joint Council to discuss on their behalf a revision of the 1919 agreement, and decided to form the Scottish Tramways Association. The first meeting of this Association discussed and referred to a Sub-Committee the revision of the 1919 agreement. The result of their deliberations was issued to their members, with the recommendation that it should be put into operation on or before June 1.

The recommendations, said Mr. Veitch, had far-reaching effects, breaking up the guaranteed 48-hours' week, reducing overtime rates of payment for public holidays, and, in effect, making a reduction in the men's weekly wage of between 4s. and 5s. as from June 1, with a further reduction of approximately 2s. 8d. per week on September 1 in regard to Sunday labour. The opinion of the men was that the employers having discussed the recommendations on the national basis, the whole matter should be settled as between the two associations, the Scottish Tramway Association representing the employers and the Transport and General Workers representing the employees. The Scottish Tramways Association had, however, intimated that they had not the power to discuss wages and conditions of service. A deputation of the employees has since been appointed to wait on the tramways manager (Mr. R. S. Pilcher). The men's union, on the authority of its members, have instructed the Scottish branches not to arrive at local settlements of the question of conditions of service but to refer such matters to headquarters.

At Glasgow the Conditions of Service Committee of the Corporation, it is understood, have recommended a reduction of about 5s. per week. The men point out that if this is put into operation it will mean a total reduction in Glasgow of 13s. per week, as against 10s. in the case of other tramway undertakings. Before the war the maximum wage of motormen and conductors at Glasgow was 35s. per week. Later a bonus of 47s. was granted, bringing the wage up to 82s. Some time ago the tramways department decided upon a reduction of 8s., and if the further reduction of 5s. now recommended is enforced the weekly wage will be 69s. It is proposed that the 5s. should be deducted in two instalments—3s. from June 1 and 2s. from July 1.

Glasgow tramway employees on Monday emphatically protested against the proposals of the Corporation Committee to reduce wages by 3s. as from June 1 and by 2s. as from July 1. These proposals, it was pointed out, would place the tramway workers in the position of receiving lower wages than those obtaining in all other tramway undertakings comparable with that of Glasgow.

The recommendations on working conditions, etc., approved by the Scottish Tramways Association on April 13 last, provide for an average duty schedule of 48 hours per week of six days. Overtime is provided for at the rate of time and a quarter. The question of Sunday rates is left to local settlement.

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MISCELLANEOUS NEWS AND NOTES.

Omnibus Losses at Lincoln.—Lincoln city omnibus service shows a loss of £3,136 for the last financial year.

Glasgow Subway.—The shareholders of the Glasgow Subway have authorised the directors to sell the undertaking, lands and property to the Corporation of Glasgow for the sum of £385,000.

Cheltenham Town Council is dissatisfied with the condition of the tramway tracks within the borough, and is considering what steps can be taken to compel the company to improve the condition of their lines.

Wages in Electrical Trades.—The Electrical Contractors' Association of Scotland and the Electrical Trades Union have mutually agreed that the present rate of wages should continue in force until December 31.

Municipal Control of Omnibus Services.—The Association of Municipal Corporations have appointed a special committee to report on the powers which local authorities should possess for the regulation of motor omnibuses.

Suggested Extension of L.C.C. Cheap Fares.—The Chiswick Council have decided to ask the London County Council to extend the operation of the cheap mid-day fares ("2d. all-the-way") to Chiswick, where the L.C.C. now have running powers over the London United Tramway Co.'s line.

Season Tickets at Dundee.—A proposal by the Tramways Committee that season tickets should be introduced experimentally has been approved by the Town Council. They will be issued to the long-distance termini where the ordinary fare is 3d., and the cost of each ticket will be £12 4s. per annum.

"Summer Fares" at Gloucester.—Gloucester City Council have decided to institute "summer fares," with a maximum of 2d., to popularise the cars and to induce citizens to use them more frequently during the summer months, particularly for recreation purposes. The concession will only apply after 2.30 p.m.

Power to Manufacture Omnibuses.—The Ministry of Transport have suggested an amendment to a clause of the Glasgow Corporation Bill (power to provide and run motor omnibuses) so as to ensure that the Corporation shall not manufacture vehicles. The Corporation has, however, decided to adhere to the clause.

Manchester Inspectors' Status.—A deputation of the Manchester tramway employees' union have urged the Tramways Committee to place the inspectors of time-papers on the administrative staff of the department. It was pointed out that this, if agreed to, would improve the statue of the officials. The committee undertook to consider the suggestion.

Proposed Penny Fares at Oldham.—Oldham Tramways Committee are to recommend a reversion to the penny minimum fare. The penny stage will be shorter than in pre-war days and the proposal is that the charge for the first stage should be a penny, with an additional halfpenny for each succeeding stage. Fares for longer distances would be proportionately reduced.

Cardiff Tramwaymen's Useful Work.—The Lord Mayor of Cardiff entertained the Corporation tramway employees at the City Hall on Sunday, May 28, and thanked them for raising over £950 for the distress fund by the sale of tickets on the cars. Mr. Sydney Jenkins (chairman of the Tramways Committee), and Mr. R. L. Horsfield (general manager) were among those present.

Nottingham Tramways Services.—As from May 28 the Nottingham tramcar, and the Dunkirk and Bagthorpe motor omnibus services are being continued on Sunday nights until half an hour later than hitherto. The Bulwell omnibuses will be run until one hour later than formerly. Considerable alterations in, and additions to, the week-day services are also being arranged.

New Plymouth Route.—The new track of Plymouth Corporation tramways along Alma Road was opened by the Mayor, who, accompanied by the chairman of the Tramways Committee (Sir Thomas Baker) and the general manager and engineer (Mr. H. P. Stokes), drove the first car along the route. The car used was one which had been constructed by the Tramways department.

Electrification of Edinburgh Tramways.—Edinburgh Town Council have negatived a proposal that electric cars be used on the Hanover Street and the Mound route. Mr. Whitson, who moved the amendment, argued that it would cost £80,000 to electrify the route and that the expenditure might be saved, as he did not believe the route would pay. Motor omnibuses could be used if the traffic merited them.

Liverpool Tramway Fares.—Councillor F. Wilson (chairman of Liverpool Corporation Tramways Committee) told the City Council that an effort would be made to cheapen fares towards the end of the present year, but the department must first get out of debt. Liverpool was paying higher wages to its tramway employees than any other municipality in the country, and nowhere were there better cars or better tracks.

Birmingham Tramway Fares.—Birmingham Tramways Committee is again considering whether fares can be further reduced having regard to the financial position of the undertaking. When penny stages were introduced in February last, a decrease of about £800 a week in receipts was occasioned and a loss still continues. Operating expenses have, however, been considerably reduced and are expected to continue to fall.

T.O.T. Philharmonic Society.—The Shepherds Bush section of this Society gave a concert to the totally disabled sailors and soldiers at St. David's Home, Ealing, W., on Tuesday, May 23, at the invitation of Mrs. Travers Humphreys, J.P., president of the Homes Comforts and Entertainment Fund. Songs, ably rendered by the choir and conducted by Mr. G. Murlis, were greatly appreciated. Solo items were contributed by Misses K. Hutt, M.A., Cook, D. Tilly Mitchell, Messrs. Ewart Beech, Will Carter, and L. C. Russell. This is the first occasion on which the Society has appeared as a concert party.

Chesterfield Corporation Proposals.—Chesterfield Corporation Tramways Committee propose to include the following new powers in the Corporation's Consolidation Bill:—To lease their omnibus powers; to abandon new railless traction routes, and in lieu thereof to take power to convert the existing tramways to a railless trolley system; the existing motor omnibus route to be continued, with powers to run to Bakewell and other outlying places.

Proposed Omnibus Services.—Hull Corporation tramways have abandoned the scheme for the extension of the tramways on Hedon Road, and have decided to establish a motor omnibus service. Ilkeston Corporation have promised to consider a proposal from Messrs. Dawson & Son to organise a motor omnibus service through the borough. Chesterfield Corporation are negotiating with Sheffield Corporation with a view to establishing an omnibus service between the two places.

S.E. & Chatham Railway Electrification.—The Electricity Commission are conducting an inquiry into an application by the Managing Committee of the South Eastern & Chatham Railway Co., for permission to build a new power station at Angerstone Wharf, Charlton. Mr. Clode, K.C., said that the site covered 26 acres, and the station was required in connection with the electrification of the railway. This involved the equipment of 648 miles of single track and the scheme for a power station at Angerstone Wharf had been approved by the Ministry of Transport. The total cost would be over six millions sterling, and the Treasury would assist in guaranteeing capital and interest.

Railway Organisation.—Sir Eric Geddes, in delivering the Gustav Canet lecture before the members of the Junior Institution of Engineers on June 1, dealt with the Railway Act, 1921. It would, he said, be rash to estimate that its results would be fully achieved for a least at generation. With the amalgamation of the railways into four great groups, administration economies became possible. A period of great anxiety and difficulty was before the railways, but he thought in the course of years charges would be progressively brought down. The future organisation was a matter of great importance to the engineering profession upon whom rested everything depending on transport.

Trackless Cars, Ltd., of Hepworth Chambers, Briggate, Leeds, have announced that they propose to have on test at Leeds between June 8 and 15 one of their new front drive double-deck railless trolley omnibuses. Subsequently the vehicle will make the journey to Bournemouth, and by the kindness of Mr. I. Bulfin, general manager of the Bournemouth Corporation tramways, a demonstration will be given on June 23 at the congress of the Tramways and Light Railways Association. We are asked to state that the company will be represented by Mr. W. H. Turner, managing director of Tramway Supplies, Ltd., (Leeds), Mr. J. A. Bishop, Mr. G. H. Kitson, directors, and Mr. J. Wright, general manager.

Newcastle Tramway Extension.—An extension of Newcastle-upon-Tyne Corporation tramways to Slatyford was opened on June 1. The route is a continuation, 1¼ miles in length, beyond the present Wingrove Road terminus, and includes several loops and some sections of double track. An inaugural run over the new line was made by members of the Transport and Electricity Committee and of the Corporation, together with various officials. Alderman R. Mayne (chairman of the Committee) drove the first car over the route, and among others present were: Councillor Sir Arthur M. Sutherland, Bart., K.B.E. (vice-chairman of the committee), Mr. Ernest Hatton (general manager of the tramways), and Major W. J. Steele (city engineer). There will be a 20-minute service from the Central Station to Slatyford and *vice versa*. Omnibuses meet the cars at Slatyford for Westerhope and Whorlton.

Whitsuntide Traffic in London.—The traffic on London tramway systems, omnibuses, and Underground railways on Whit-Monday constituted a record. The L.C.C. tramways carried some 2,500,000 passengers, the day's receipts totalling over £20,000. This record was established without including the traffic on the Leyton system which the County Council now operate. Over 900,000 people used the London United, the Metropolitan Electric and the South Metropolitan Electric tramways. The motor omnibuses carried, at a conservative estimate, nearly 4,000,000 passengers, while the Underground railways accounted for almost 1,000,000. The grand total of the Underground group (railways, omnibuses and tramways) was therefore nearly 6,000,000. It was estimated that on the Epping Forest omnibus routes alone there were over 85,000 passengers. Some 3,000 omnibuses were utilised altogether.

South Shields Extensions Opened.—The new routes of South Shields Corporation tramways in Mile End Road and Sunderland Road and the first completed portion of the light railway to the housing estate at Cleadon Park were formally opened on May 31. A special car containing the chairman of the Tramways Committee (Councillor J. G. Winskell), the vice-chairman (Councillor W. Stephenson), members of the Committee and officials of the Corporation was run over the route. The party were afterwards entertained at luncheon by Councillors Winskell & Stephenson. The chairman of the Tramways Committee mentioned that they owed a debt of gratitude to the borough engineer and the tramways manager (Mr. J. C. Whiteley), for their valuable work in connection with the preparation of the scheme. Their services had enabled the committee to carry out the undertaking without the assistance of a consulting engineer.

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Municipalisation of a Large U.S. Tramway.—The citizens of Detroit, Michigan, have decided by a majority of nearly 82 per cent. to approve a plan for the purchase of the undertaking of the Detroit United Railways, a company which has provided the tramway service for the city for many years. The question of municipal ownership has been more or less vigorously discussed for about 30 years, and under the present decision the system will be taken over by the city on May 15. It is expected that the municipally-owned system will become one of the largest municipal tramways in the world, as the city will own 263 miles of track, and run 1,457 cars. To pay for the undertaking, bonds to the amount of $4,000,000 may be issued, of which $2,770,000 will be paid to the company when the system is taken over on May 15. The remainder of the money will be used to purchase material and supplies, and to provide working capital. Annual payments of £500,000 will be made by the city until 1933, when the balance of $19,850,000 will become due. Interest is to be paid at the rate of 6 per cent. on all unpaid balances. The Mayor, Mr. James Couzens, who is an ardent supporter of the change of ownership, believes the city will be able to make its payments out of the earnings from the system, as well as to pay for the necessary upkeep and improvements. The city will not be liable in the event of the system failing to earn enough money to meet the payments, as no collection could be made from taxes. In the event of failure of the city to meet the obligations, the company could resume possession of the property. Mr. E. J. Burdick, vice-president and general manager of the Detroit United Railways, is quoted as saying that the price paid is $10,000,000 below its present day value, and that as the company's organisation is being taken over by the city, there is no reason why this venture should not succeed.

PERSONAL.

Mr. A. A. Campbell Swinton has joined the board of W. T. Henley's Telegraph Works Co.

Mr. Arthur J. Abraham, who, as noted in our issue of last week, has resigned his appointment of tramways manager and electrical engineer of Aberdare Urban District Council, has accepted a similar post under the Bexley (Kent) Urban Council.

Mr. D. H. Duff, works manager of the motor constructional works at Brislington of the Bristol Tramways and Carriage Co., has died at the early age of 38, after an operation for appendicitis. He was the son of Mr. Daniel Duff, for many years general manager of the London Road Car Company, and now a director of the London General Omnibus Company.

Mr. J. M. McElroy.—Referring to the retirement, at the end of June, of Mr. J. M. McElroy, general manager of Manchester Corporation tramways, the *Manchester Guardian* says that he confesses to deriving a good deal of satisfaction from the fact that he will remain until the twenty-first anniversary of the opening of the first city route over which electrically driven cars were run. This route—Cheetham Hill—was formally opened on June 7, 1901.

Mr. John Sutherland, who has been station-master at Baker Street Station since 1903, is to retire at the end of this month after nearly 42 years' service with the Metropolitan Railway Company. Mr. Sutherland saw the whole of the transformation from steam to electricity and the rebuilding of the station, which occupied three years, without any interruption of traffic. During his period at Baker Street the daily traffic has increased from 900 to 1,400 trains per day.

Mr. Edward H. Fleming, having resigned his position with the Anti-Attrition Metal Co., Ltd., has joined Messrs. P. R. Metals, Ltd., of Brentford. (It will be recalled that Mr. G. F. Craven, formerly general manager of Reading Corporation Tramways, is a director of this company.) Mr. Fleming has been associated with the tramway industry in the erecting and operating as well as the commercial departments for twenty-three years. He assisted in the construction of the electric locomotives for the Central London Railway in 1899, while in the employ of the British Thomson-Houston Co., and later superintended for that firm the erection of the electric cars for Newcastle-on-Tyne Corporation tramways. At the inauguration of the Newcastle system, Mr. Fleming was appointed rolling stock superintendent, and he served under Mr. A. E. le Rossignol and Mr. Ernest Hatton. In his new position Mr. Fleming hopes to maintain his old business connections, while extending his field of work to other engineering industries.

FINANCIAL.

Pernambuco Tramways and Power Company, after providing for debenture interest and transferring £10,230 to capital reserve, and £1,500 to amortisation fund, have a surplus of £1,108, which is to be carried forward.

Yorkshire (WestRiding) Electric Tramways Company, Ltd.—The directors propose to pay, on July 1, an interim dividend of 3 per cent., being at the rate of 6 per cent. per annum on the 6 per cent. cumulative preference shares for the half-year ending June 30, 1922.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended May 27 give total receipts of £374,440, or £6,211 more than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £192 4s. 4d. per mile of single track, and last year at the rate of £189 0s. 7d., thus showing an increase for the week of £3 3s. 9d. per mile open.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended June 7 amounted to £104,917, a decrease of £142 compared with the corresponding period last year. The route length was 160.73 miles, as compared with 152.52 a year ago. From April 1 (the commencement of the financial year) to June 7 (9½ weeks), the total receipts were £932,890, a decrease of £68,144 on the corresponding period of 1921.

Preston Corporation Tramways.—Alderman T. Parkinson (chairman of the Tramways Committee) informed the Town Council that the department had emerged from the past year in a better condition than was anticipated. They had a surplus of just over £4,000, which it was proposed to transfer to the reserve fund. During the year they spent £12,000 from the reserve fund, which now stood at £40,000, as compared with £50,000 last year.

Glasgow Corporation Tramways.—For the year ended May 31 last, Glasgow Corporation tramway traffic receipts totalled £2,341,031, as compared with £2,386,246 in the previous year, a decrease of £45,215. The passengers carried, 430,954,005, as against 447,455,988 for the previous year, a decline of 16,501,983. The ¾d. and 1d. fares decreased to the extent of 19 million, while all the longer distance fares showed an increase—a fact which seems to indicate that the abolition of the halfpenny fare has resulted in many people walking the short distances. The all-night service brought in a revenue of £5,632, while the passengers carried by these special cars totalled 411,628.

Hull Corporation Tramways.—The annual report of Hull Corporation Tramways which was recently presented to the Committee by Mr. E. S. Rayner (the general manager), states that the receipts have shown a continuous and heavy decrease as compared with the previous year, due to the trade depression. The total decrease was £21,343, but there was a "true profit" on the year's working of £21,687. After allowing for certain charges (including £14,000 spent on finding work for the unemployed) there is a surplus balance of £2,016. (It will be recalled that it was recently decided to allocate £10,000 to the relief of rates.) The Chairman of the Tramways Committee, Mr. A. D. Willoughby, proposed that the salary of the tramways manager be increased to a basic salary of £1,000, with the bonus now in operation, but the motion was defeated by five votes to three.

Birmingham District Power and Traction Co.—The 38th annual meeting was held in London on May 25. Mr. C. S. B. Hilton (chairman and managing director) presiding. The Chairman said, in connection with the delimitation of areas by the Electricity Commission for the improvement of electricity supply, a scheme proposed by the Birmingham Corporation, in conjunction with the Shropshire Power Company, had been submitted to the Electricity Commissioners, and met with their approval. A further enquiry was being held at Birmingham to give effect to the scheme. This should improve the Shropshire Power Company's position and prospects. The tramway receipts in the Black Country suffered seriously owing to the coal strike, with the result that reduced dividends on the ordinary shares had been paid by the Dudley and Wolverhampton companies. On the other hand, the Birmingham and Midland Motor Omnibus Company had expanded, and had paid a bonus in addition to the usual dividend of 10 per cent. While it was hoped that the agreed reduction in wages and the fall in the cost of material would enable the company to maintain its present position, the outlook was not without anxiety.

CONTRACTS

Hull Tramways Committee have accepted the tender of Messrs. Vickers, Ltd., for 200 steel tyres.

Edinburgh Town Council have accepted the tender of the British Mannesman Tube Company, Ltd., for single tramway standards for erection in Princes Street at £16 15s. each.

Glasgow Tramways Committee have recommended acceptance of the tender of the Metropolitan-Vickers Electrical Co., for reconstructing car magnetic brake equipments, and adding skid-proof attachments.

TENDERS INVITED.

COUNTY BOROUGH OF WIGAN TRAMWAYS DEPARTMENT.

Uniform Clothing.

The Tramways Department of the Wigan Corporation invite Tenders for the supply of Uniform Clothing required by the Department.

Particulars of the requirements may be obtained on application to the Tramways General Manager, Market Place, Wigan.

Sealed Tenders endorsed "Tramway Uniforms," together with samples, to be delivered to me not later than Monday, the 26th inst.

The Committee do not bind themselves to accept the lowest or any Tender.

WILLIAM HENRY TYRER,
Town Clerk.

Municipal Offices, Wigan.
July 9, 1922.

POSITION VACANT.

WANTED.—ROLLING STOCK SUPERINTENDENT for system of electric tramways and railless in Far East.—Applications with copy references, stating experience and salary required, to be addressed to T. B., Basildon House, Moorgate, E.C.2.

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FOR SALE.

WIGAN CORPORATION TRAMWAYS DEPARTMENT.

The Wigan Corporation Tramways Committee invite offers for the purchase of one single-deck, saloon type Motor Omnibus Body, which is in excellent condition.

Full particulars and permission to view may be obtained on application to the Tramways General Manager, Market Place, Wigan.

Sealed Tenders, endorsed "Motor Omnibus Body," to be delivered to me not later than the 26th inst.

WILLIAM HENRY TYRER,
Town Clerk.

Municipal Offices, Wigan.
June 9, 1922.

FOR SALE.

Bus Body, complete with top deck, staircase, platform, hand-rails, etc.; seating capacity, 16 inside, 18 outside.—Apply Box No. 29, THE TRAMWAY AND RAILWAY WORLD, Amberley House, Norfolk Street, London, W.C.2.

POSITION WANTED.

Welder (Electric) wants permanent situation. Experienced in fishplate and surface welding.—Address, H. DASHPER, 54, Holland Road, Kensington, London, W.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.

Cars, Motors and Controllers
(DICK, KERR SYSTEM).

Queen's House, Kingsway, London, W.C.2.

TRAMWAY SUPPLIES, Ltd.

Tramway Engineers,

OVERHEAD LINE MATERIALS AND SUPPLIES.

Sole Manufacturers of

TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams: "Controller, Leeds."
Telephone 68, Headingley.

GROVE MILLS,
MEANWOOD, LEEDS.

London Office: 93, CANNON STREET, E.C.4.
Telephone: City 3014. Telegrams: "Tramsuplim, Cannon, London."

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922.	+ or −	Aggregate. Wks.	1921-22.	+ or −
Aberdeen Corporation	May 31	1,526	3,935	+ 2,409	52¾	183,589	− 7,140
" Motor Buses	" 31	593	319	− 276	52¾	11,619	+ 7,775
Ayr Corporation ..	June 3	659	640	− 19	3	1,863	− 2
Barrow Corporation ..	" 3	851	670	− 181	9	5,448	− 2,665
Belfast City	" 2	13,090	10,911	− 2,179	9	107,519	− 9,856
Birkenhead Corporation	" 4	2,339	2,498	+ 159	9¾	23,579	+ 258
" Motor Buses	" 4	817	838	+ 21	9¾	6,584	+ 349
Birmingham Corporat'n	May 27	25,559	29,615	+ 4,065	8	234 871	− 14,344
" Motor Buses	" 27	2,410	2,108	− 302	8	14,970	− 3,306
Blackburn Corporation	" 31	1,445	2,766	+ 1,321	9¾	23,341	+ 3,850
Bradford Corporation..	" 27	10,940	14,477	+ 3,537	9	115,737	+ 3,575
Burnley Corporation ..	June 3	2,859	3,299	+ 440	..	..	..
Burton-on-Trent Corp.	" 4	577	606	+ 29	9	5,129	− 601
Bury Corporation ..	" 4	1,949	2,544	+ 595	9¾	23,333	+ 581
Chatham & District ..	May 25	1,550	1,921	+ 371	21	32,091	− 2,168
Chesterfield Corporat'n.	" 29	1,255	1,212	− 43	8	10.624	− 1,101
Derby Corporation ..	June 3	1,629	2,287	+ 658	9	19,700	+ 303
Dundee City ..	May 31	2,434	3,246	− 188	2¾	7,139	− 716
East Ham Corporation	June 3	2,057	2,179	+ 122	9½	19,920	+ 575
Edinburgh Corp. Trys.	May 27	14,784	16,236	+ 1,452	2	24,469	− 3,776
" Motor Buses	" 27	8,520	1,586	− 6,934	2	7,287	− 1,233
Glasgow Corporation ..	June 3	51,068	47,072	− 3,996	½	22 258	+ 237
Glossop (U.E. Sup. Co.)	" 3	191	226	+ 35	22	5,007	− 200
Halifax Corporation ..	May 30	3,629	4,711	+ 1,082	9¾	37,093	+ 951
" Motor Buses	" 30	101	82	− 19	8½	517	− 428
" Railless Cars	" 30	..	38	..	8½	484	...
Huddersfield Corporatn.	June 3	5,430	5,574	+ 144	10	53,390	− 3,106
Ilford U.D. Council ..	" 3	1,538	1,552	+ 14	9½	13,913	− 229
Ipswich Corporation ...	" 3	736	891	+ 155	9	7,509	+ 299
Isle of Thanet ..	May 31	902	1,054	+ 152	34½	23,114	+ 762
Kilmarnock Corporat'n	June 3	384	335	− 49	2¾	920	− 178
Leicester Corporation..	" 3	5,002	7,986	+ 2,984	22	161,134	+ 30,292
Liverpool Corporation	" 3	26,797	31,325	+ 4,528	22	639,807	+ 34 483
London County Ccl. ..	" 7	105,059	104,917	− 142	9¾	932,890	− 68,144
Maidstone Corporation	" 1	392	475	+ 83	8¾	4,448	+ 33
Manchester Corp. ..	" 3	40,131	36,149	− 3,982	9	337,064	− 28,481
Newcastle-on-T. Corp.	May 27	10,375	10,127	− 248	8	88,111	− 7,217
Nottingham Corp.	June 1	3,971	7,930	+ 3.959	9	68,794	+ 19,437
Oldham Corporation ...	" 4	4.672	4,935	+ 263	10	47,845	− 1,847
Preston Corporation ...	May 31	1,860	1,876	+ 16	8¾	15,758	− 1,126
" Motor Buses	" 31	..	127	..	8½	1,122	..
Reading Corporation ...	June 1	1,452	1,605	+ 153	9	13,860	+ 368
" Motor Buses	" 1	361	350	− 11	9	2.993	− 50
Rotherham Corporation	May 29	2,017	2,190	+ 173	8	17,216	+ 388
Salford Corporation ..	June 4	11,098	11,207	+ 109	9¾	98,336	− 6,013
Sheffield Corporation..	May 28	19,069	18,865	− 204	8¼	151,173	− 8,380
Southampton Corp. ..	" 31	2,125	3,354	+ 1,228	9	26,972	+ 3,856
" Motor Buses	" 31	412	98	− 313	9	880	− 1,580
Southend-on-Sea Corp.	" 24	1.825	2,396	+ 571	8	17,640	+ 4,177
South Shields Corp. ..	" 27	1,610	1,692	+ 82	8	13,653	+ 1,195
St. Helens Corporation	" 30	1,783	1,714	− 69	9	13,759	− 1.571
Sunderland Corp. ..	June 4	2,508	2,814	+ 306	9	23,170	+ 691
Swindon Corporation..	May 31	376	382	− 6	8½	3,172	− 359
Tyneside Trys., Trds...	" 24	1,312	884	− 428	21	17,044	− 8,180
Wallasey Corp. ..	June 3	2,589	2,764	+ 175	9½	23,730	− 1,312
" Motor Buses	" 3	205	282	+ 77	9½	2,158	− 28
Walsall Corporation ..	" 3	1,566	1,555	− 11	9	14,958	− 563
" Motor Buses	" 3	802	792	− 10	9	8,192	− 313
Walthamstow U.D.C....	" 3	2,201	2,115	− 86	9½	17,960	− 2,169
Warrington Corp. ..	" 1	821	977	+ 156	9	8,779	+ 45
West Ham Corp. ..	" 1	5,184	5,871	+ 687	8¾	51,469	− 472
Wolverhampton Corp.	" 7	2,218	3,131	+ 912	10	22,295	− 620
" Motor Buses	" 7	612	964	+ 352	10	6,701	+ 444

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1921.	1922.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	June 3	£81,776	83,407	22	£1,851,654	+ 74,784
Ballarat & Ben. (4 wks.)	Mar. 26	4,935	5,244	52	60,698	+ 3.525
Brazilian Traction (Mrs)	April	13,562,000	15,413.000	17	60,156,000	+ 8,676 000
Brisbane	April	47,750	48,700	17	192,590	+ 9.055
British Columbia $	April	835,793	818,177	43	8,589.842	+ 122,528
Buenos Aires Lacroze ..	April	60,238	57,619	44	579,438	+ 8,486
Burmah Tr. & Lght. Rs.	April	50,159	58,631	39	522,054	+ 63,796
Calcutta .. Rs.	June 3	81,280	105,262	22	2,336,585	+ 762,278
Cape Town	April	27,662	28,657	..	..	..
Carthagena & Herrerias	May	1,602	2,793	21	13,777	+ 904
Cordoba	Mar.	21,717	25,382	52	277,368	+ 39,922
East India	May	4,392	3,960	43	41.042	− 1,337
Kalgoorlie ..	Mar.	2,485	2,390	13	6,601	+ 1,652
La Plata ..	Mar.	* 3,403	7,067	13	20.109	+ 9.471
Madras (2 weeks) Rs.	May 15	* 51,0.2	48,663	19	444,842	+ 148.890
Manila .. .. $	April	279,534	286.044	17	1,189,893	− 15,816
Montevideo	May	46,579	48.074	30	327,493	− 5,963
Para	April	22.289	23,061	21	112,507	− 1,000
Pernambuco	June 4	3.769	2,531	22½	77,799	− 16,792
Port Elizabeth	April	7,082	6,892	..	..	..
Rangoon .. Rs.	Mar.	158,121	150,500	13	418,933	+ 17,536
Shanghai .. $	April	157,500	184,500	17	720,217	+ 94,478
Singapore .. $	April 8	13,249	17,019	14	209,356	+ 39,857
Winnipeg .. $	April	462,378	435,058	17	1,871,392	− 52.548

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

Common Fund Companies.		
Metropolitan District Rly. Co. ..	Week ending June 3, 1922 ..	£248,956
London Electric Rly. Co.	Corresponding week last year ..	244,143
City & South London Rly. Co. ..	Increase	4.813
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	4,860.981
London General Omnibus Co., Ltd.	Corresponding period last year ..	5,162,290
	Decrease	301,309

London & Suburban Traction Group		
Metropolitan Elec. Tramways, Ltd.	Week ending June 3, 1922 ..	£57,591
London United Tramways, Ltd.	Corresponding week last year ..	55.426
South Met. Elec. Tr. & Ltg. Co., Ltd.	Increase	2,165
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	1,053.794
	Corresponding period last year ..	1,153,102
	Decrease	99,308

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending June 3, 1922 ...	£33,221	£3,655	£36,876
Total Receipts (22 weeks) ...	721,969	82,078	804,047

MERSEY RAILWAY			
Week ending June 3, 1922 ..	—	—	£4,368
Total Receipts (22 weeks) ..	—	—	100,590

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THE Tramway & Railway World
WITH MOTOR TRAFFIC SECTION

Founded 1892. LONDON, JUNE 15, 1922. VOL. LI.

NOTES ON RAILLESS ELECTRIC TRACTION.

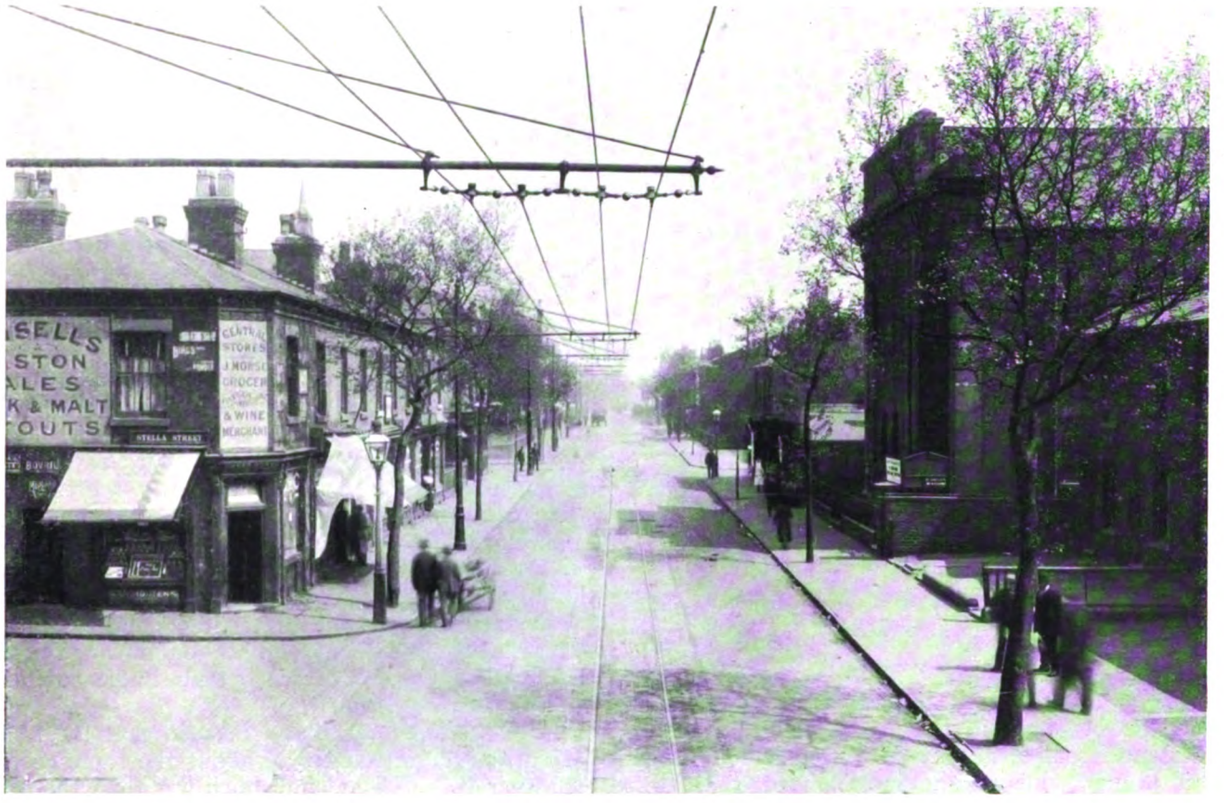
By E. M. MUNRO, M.I.E.E., M.I.Mech.E.

(*A paper to be read at the Congress of the Tramways and Light Railways Association at Bournemouth.*)

Railless electric traction has come to be accepted by numbers of officials who are responsible for the operation of public passenger services as offering a possible solution to some passenger transport problems not readily met by the older established methods. The development of this form of transport reached the stage when its reliability and cheapness were demonstrated at a time when it became clear that the increased costs of constructing new tramways, and in some cases the outlay necessary to rehabilitate existing routes could not be undertaken on a remunerative basis.

The alternative of the petrol or petrol-electric omnibus has been widely adopted, and the results are testimony that this form of transport will retain its popularity wherever revenue and conditions favour it. Railless electric traction, too, has its not inconsiderable field which will no doubt be enlarged as its adaptability becomes more widely demonstrated.

An examination of the characteristics of the railless car yields some interesting results. In the following notes it is proposed to traverse the subject by an analysis of the principles involved with some data put together for this purpose, and brief reference will be made to types of cars already constructed and in daily service from which the particulars here given have been obtained. Certain data relating to tramcars and petrol omnibuses have necessarily been included to show where the railless car stands. The various matters considered are perhaps dealt with upon rather general lines, but the breadth of the subject necessitates such treatment to bring it within the limits of this



View of Overhead Wiring for Railless Traction on Birmingham Converted Tramway.

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contribution. The discussion will no doubt amplify such portions as are of interest amongst the following—

Capacity and speed,	Types of vehicles,
Cost of installation,	Power,
Operating costs,	Conclusions.

CAPACITY.

The number of seats in a mechanically propelled road car is limited by the axle loads permitted and the width and length of bodies allowable. Typical seating plans are shown in Figs. 1, 2 and 3—the first single-deck cars and the last two double-deck cars.

Table I. sets out the particulars of these cars compared with similar data in respect of other forms of passenger vehicles with the object of fixing the position of the railless car in the scale of capacities.

These cars represent types which are in daily service maintaining regular schedules.

TABLE I.

Type of Car.	Weight Unladen. Tons.	cwts.	qrs.	No. of Seats.
Railless.				
Single-decked Car ...	4	10	0	28
,, ...	5	3	0	36
,, ...	4	0	0	24
,, ...	4	18	0	29
Single-decked Car—Average				355 lbs. per seat.
Double-decked Car ...	6	16	0	51
,, ...	7	8	0	51
,, ...	7	4	0	59
Double-decked Car—Average				297 lbs. per seat.
Tramcar.				
Single-decked Car ...	14	8	0	36
Single-decked Car				896 lbs. per seat.
Double-decked Car ...	13	14	2	72·74
,, ...	10	19	1	58·60
,, ...	10	16	2	58·60
,, ...	13	5	3	72·74
,, ...	14	8	0	74·76
,, ...	14	14	2	78
,, ...	13	14	2	62
,, ...	15	15	0	62
Double-decked Car—Average				440 lbs. per seat.
Petrol Omnibus.				
Single-decked 'Bus ...	4	6	0	24
,,	5	10	0	28
Double-decked 'Bus...	4	17	0	34
,,	4	10	0	57
,,	4	17	1	37
,,	4	17	3	38
Petrol Omnibus Average				296·9 lbs. per seat.
,, ,, (double-decked)—Average...				256·4 lbs. per seat.

From Table I. it will be seen that the double-decked petrol omnibus has the lightest weight per passenger seat of any type of vehicle considered. This is in part due to the inclusion of the latest form of omnibus designed for service in the metropolitan area. To what extent the form of construction used in the design of the bodies of such vehicles could be generally applied in other services is not here under consideration. Hitherto it has been deemed expedient to have bodies built to a scantling somewhere between this and the tramcar body for railless services over provincial roads; the difference is, however, not great, and it is of interest to have this example included from a purely structural point of view.

As to capacities, we can see that the railless car has increased from 28 to 59 seats, at which figure it must stand if the 5-ton axle load is to be the maximum pending results of further developments in design with the object of reducing proportion of total load per axle.

Table II. gives certain data by means of which the approximate cost of energy per passenger mile can be ascertained.

TABLE II.

Type of Car.	Energy per car mile.	Average Passengers carried per mile on 38% seats.	Cost of Energy per car mile at 1½d. kw.h.	Average Speed m.p.h.	Cost of Energy per passenger mile.
Railless s.d. ...	1·00 KW.H.	11	1·5d.	8·0	·136d.
,, d.d. ...	1·66 KW.H.	20	2·49d.	8·0	·125d.
Tramcar ...	2·00 KW.H.	24	3·0d.	7·5	·125d.
Petrol Omnibus (petrol)	·166 gals.	13	4·359d.	8·0	·335d.

The above results are averaged from a number of examples and types examined for this purpose.

Column 2—Railless.—It will be seen that the energy consumption represents an expenditure of about 190 to 195 watt hours per ton mile, which includes line losses. The actual energy consumed at the car should not exceed 150 watt hours per ton mile on good average road surface, and with the improved bearings now being incorporated in the latest designs it is not expected that more than 140 will be recorded on the car if line volts are well up and the number of stops per mile are not excessive.

Column 3.—For the purpose of comparison the number of passengers was arrived at in the following way. The number of passengers picked up per mile was taken from the records of a large tramway undertaking, and the average length of journey per passenger assumed to be a little over two miles. This worked out at about 38 per cent. of the seating capacity of the car, the same percentage being also used for the other types of car.

Column 4.—Similarly for comparative results the same rate of charge for electric energy has been taken in each case, viz., 1½d. per KW.H.

Column 5.—The average speeds, including all stops, are those actually operated upon the systems from which most of these particulars were taken.

Column 6 gives the results for which this table was constructed, and will no doubt fairly represent the comparative expenditure of energy per passenger mile upon any average route.

As regards the data given for petrol omnibuses, these figures have been obtained from one of the largest municipal omnibus services in the country, but do not include any reference to the omnibus services in the metropolitan area which operate under conditions not elsewhere existing.

From the foregoing it can be seen that the railless car carries its passengers at about the same cost for energy as the tramcar, and much less than the petrol car, and that its capacity has reached the point where it can in this respect be considered in connection with all but the densest traffic, also that the average speed is a quite satisfactory feature.

It is, of course, not possible to find a common denominator for these different vehicles, therefore average examples have been selected from the preceding tables for Table II., and it is certain that the features disclosed would exist in some degree on any system where comparisons could be made.

Thus the railless car is an economic high-speed vehicle of adequate capacity, and the cost of installation and operation is, as we shall see, lower than for other

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forms of road traction within the limits of its economic application.

COST OF INSTALLATION.

So far the railless lines in actual operation have been constructed upon routes and for services which have not warranted the expenditure of the capital sums necessary for a tramway, and for that reason it is not possible to compare the effect of the great difference in capital cost between these two systems by a reference to the published figures for interest and sinking fund per car-mile. To get an idea of what effect this difference would have on these figures one must have recourse to estimates based upon similar requirements. As yet the only instance of such a case is that of an important installation in this country where a route at present operated by tramways is to be equipped with railless, and a city service of four minutes headway is to be maintained.

Here the published figures state that upon this 2½ mile route the saving in capital cost is such that a loss of £3,000 per annum which would follow upon the reconstruction of the tramway track will be avoided, and instead a profit of £3,000 per annum is estimated to be available by the adoption of railless.

These notes are not intended to comment upon the actual cost of tramway track and overhead line equipment either for tramways or railless, but to illustrate the effect of the fundamental differences in construction between the two systems, also to introduce the statement that on less than a certain length of headway railless can operate more economically with its overhead line equipment than the petrol omnibus does without this expense.

The location of the critical point where the advantage is neither to the tramcar or railless has been worked out by Mr. R. H. Wilkinson, the general manager of

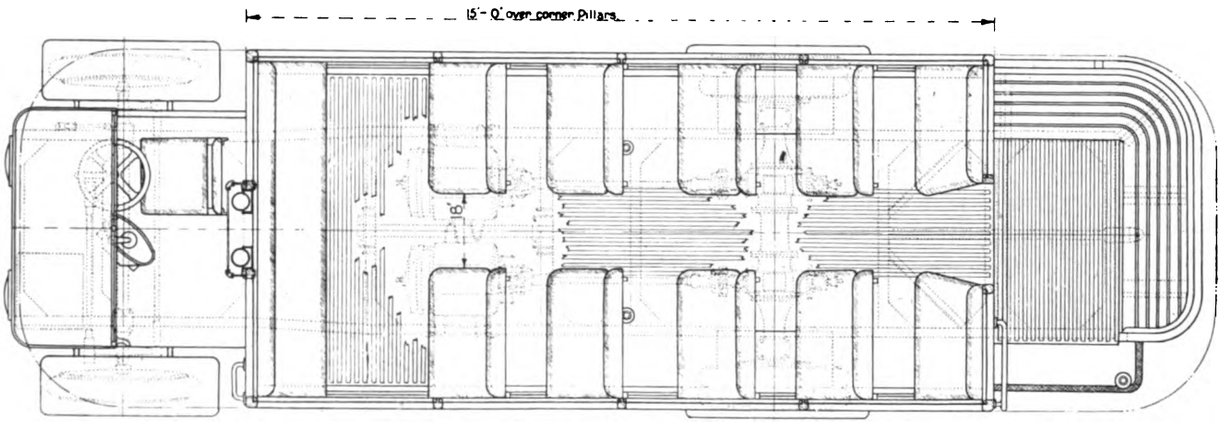

Fig. 1.—Seating Plan of Single-Deck Railless Car.

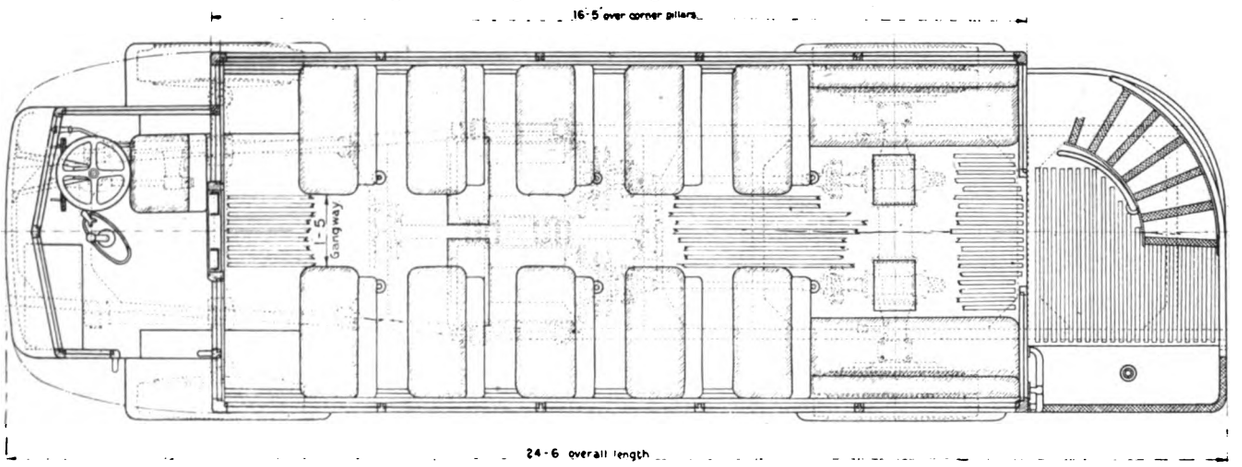

Fig. 2.—Seating Plan of Lower Saloon—Double-Deck Railless Car.

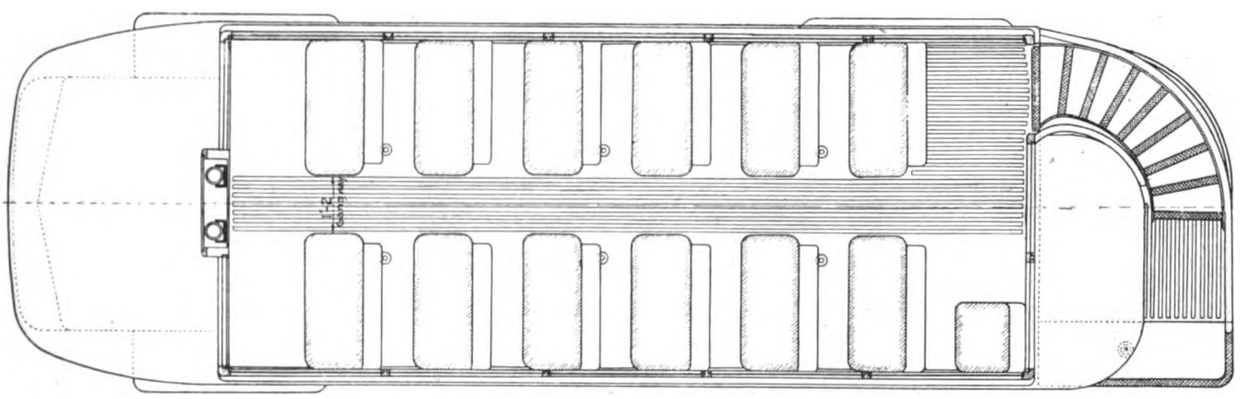

Fig. 3.—Seating Plan of Upper Saloon—Double-Deck Railless Car.

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the Bradford Corporation Tramways, as follows—

(*a*) Between single-line tramway and railless it is in the neighbourhood of a three-minutes service.

(*b*) With a two-minutes headway railless is more economical than a double-line tramway, but more costly than a single-line tramway.

The point at which the railless car ceases to be more economical than the petrol omnibus in regular service has been variously estimated between 30 and 45 minutes' headway. Mr. C. J. Spencer contributed an article in which this was dealt with at the June 1913, meeting of the Managers' Section of the Municipal Tramways Association, and at that time placed this point somewhat higher.

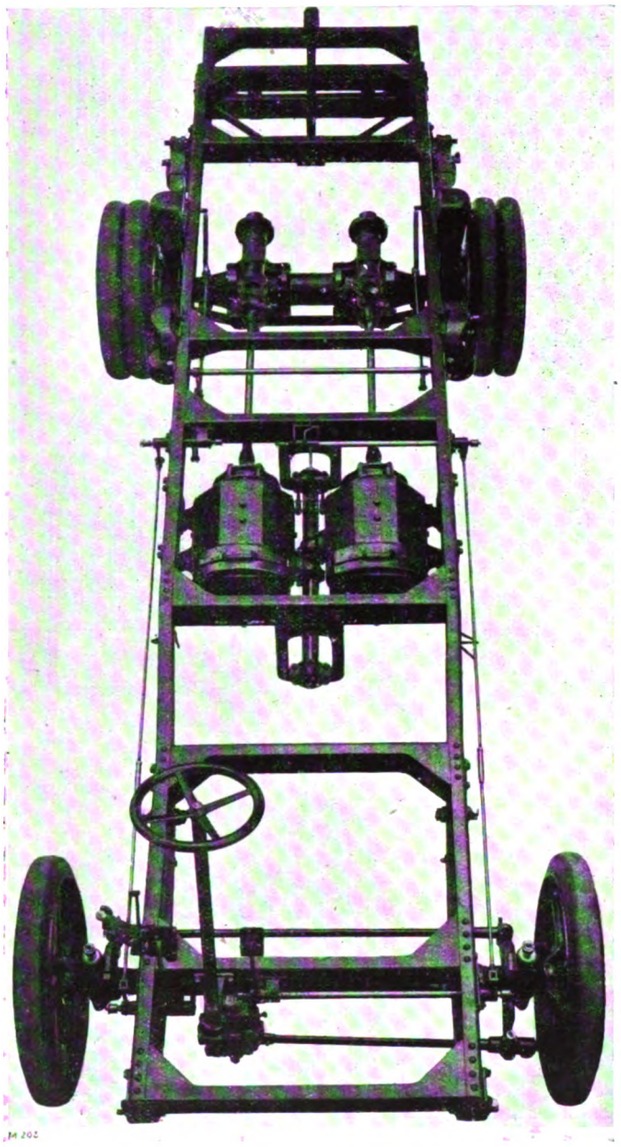

Fig. 4.—Plan View of Chassis of Single-Deck Car.

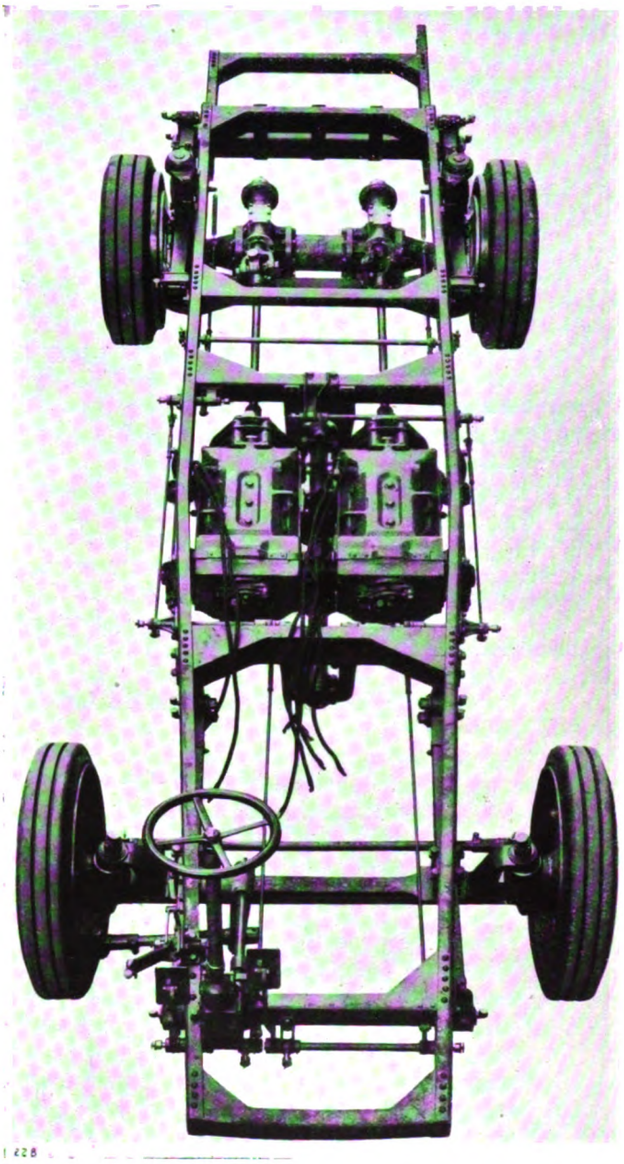

Fig. 5.—Plan View of Chassis of Double-Deck Car.

At the present time the cost of materials and labour move so freely that an exact estimate could probably only be made upon some specific set of conditions; but the principle would stand, and no doubt determine the critical headway within the figures given.

On these bases between the 3 minute and 45 minute headway railless cars have the advantage in economy of operation; on longer headways the petrol car, and on shorter headways the tramcar is more economical.

The factors from which these results proceed are—

High average speed of railless cars and longer life as compared with the petrol omnibus.

Saving of cost of track, notwithstanding increased cost of overhead line, as compared with the tramcar.

Operating Costs.

Operating costs for railless cars as compared with petrol omnibuses are lower on account of—

High average speed;
Smaller cost for power;
Relative simplicity of construction;
High overload capacity.

If petrol costs 2s. per gallon, and six miles per gallon is the work it does, the railless car at 190 watt hours per ton-mile costs 50 per cent. less with energy at 2d. per KW.H.

The increase in average speed is due to higher acceleration and extra power available on grades and under overload conditions as compared with the petrol omnibus; and in the case of the tramcar the higher travelling speed owing to the absence of checks due to slower moving traffic encountered.

The simplicity of construction lies in the employment

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of the electric motor as propelling agent, and the accompanying speed control, which is devoid of mechanical transmission of power, consisting as it does of simple mechanism for the regulation of the supply of current to the motors. For the rest, the chassis of a railless car is no more complex than that of the petrol vehicle; recent designs indicate that the adaptation of the chassis perfected for petrol drive for use on railless cars is expected to cheapen the latter in vehicles up to a certain size.

It may be of interest to state that in an actual railless schedule which is shortly to be operated the power to be taken by each car varies from 40 KW. to 100 KW. on level and on maximum grade under full load conditions in order to maintain an average of 8 miles per hour with seven stops per mile, the maximum variation in rate of expenditure of energy under all conditions is from 25 KW. to 100 KW.; 58·8 H.P. being the continuous rating of the motor equipment, 84 B.H.P. is the power at one hour rating, but if this conventional measurement is reduced to continuous rating, the range of power as actually needed for the performance of the vehicle is more easily compared with the range of power available from the internal combustion engine as a propelling agent. It is this natural range of power which enables railless cars to maintain a schedule speed not always possible with petrol omnibuses fitted with any commercial size of engine.

The single motor chassis is a more recent product than that with the two-motor equipment. It does in a number of cases offer advantages over the more economic series parallel control, chiefly owing to its simplicity and lower cost, which becomes effective where the service does not call for many stops per mile. Other claims for superiority are put forward on its behalf, such as reduction in maintenance costs and convenience in readily obtaining spare parts at low costs, this single motor being easily mounted in any good form of standardised petrol chassis, and further greater comfort in riding is claimed. In addition a longer life is assumed for the chassis by reason of the several parts composing it being the product of a long refining process by trial and error.

From the mechanical point of view these advantages are beyond question if the chassis is used for the service it was designed to maintain. From the electrical side one or two matters must be taken into account; e.g., the desirability of controlling the whole range of speed in one motor is not questioned where but few service stops are made, but if the stops are frequent it must be borne in mind that rheostatic losses are likely to be heavier, and if the cost of energy is a consideration, it may be worth while to ascertain what the increase in energy consumption may be.

The matter is this—series parallel control is economical in current consumption from two points of view. With two motors the rheostatic losses are at least one-half the losses in a single motor. In regular service of average character the ordinary rheostatic losses with two-motors series parallel control amount to about 15 per cent. of the total energy consumption on the car. If these losses are doubled the disadvantage of the single-motor system would be about 15 per cent. increase in energy consumption. In addition to this it must be remembered that in traffic it is often necessary to run at half-speed with series-parallel control-motors in series. This is effected with but the small reduction in motor efficiency due to the lower voltage drop across each motor; but with a single motor the half-speed must be got by inserting resistance in the motor circuit.

For the same pull produced by the motor with plain rheostatic control of a single motor the input to the equipment is just the same whether the motor is running at full speed or at half speed. If the efficiency at full speed is 80 per cent. at half-speed it is only 40 per cent.

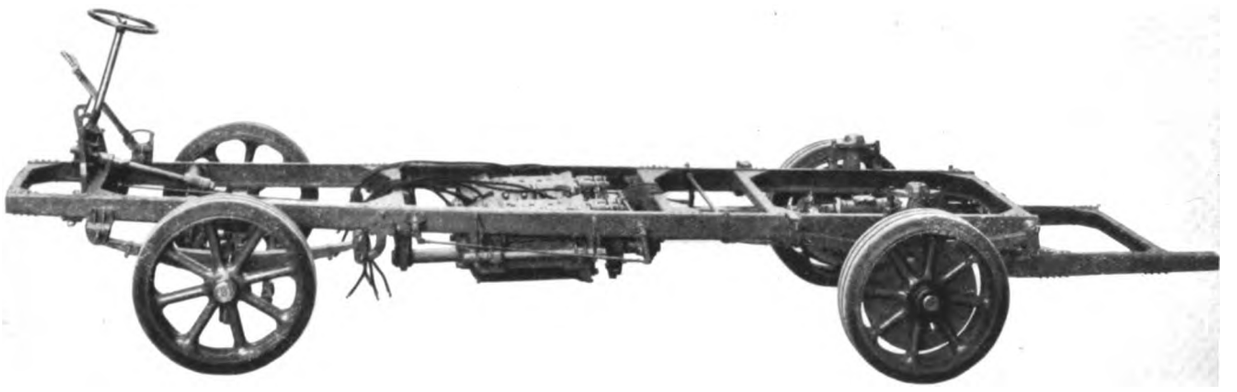

Fig. 6.—Side Elevation of Chassis for Double-Deck Car.

Railless cars requiring motors of more than 40 H.P. have not been constructed upon any of the well-known petrol passenger chassis designs, but have chassis specially designed for the transmission to wheels of powers not as yet usually employed on petrol chassis. Moreover with the limited headroom from roadway to floor of car it is very doubtful if a single motor could be conveniently got in. With the two-motor equipment mounted upon the chassis frame a conveniently low floor is available; the straight drive to each rear wheel is effected, and the front of the car left clear for the standard front axle and steering gear. Fig. 4 shows this form of chassis for a single-deck car with 30 seats, and Figs. 5 and 6 for a double-deck 50-60 seat car. In the former two 20 H.P. motors are used, and in the latter two 42 H.P. motors are required. The height of floor from the ground in these cars is

Single-deck car	3 ft. 1 in.
Double-deck car	2 ft. 11¾ in.

Figs. 7 and 8 show a single motor chassis for a 30-seat car.

Whilst cars of moderate seating capacity will no doubt continue to be employed upon routes running

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through more or less thinly populated areas, cars with large seating capacity are being constructed to meet the anticipated extension of the field of railless operation to more densely populated areas. Fig. 9 shows plans and elevations of one of these vehicles, Fig. 10 a back axle and Fig. 11 a motor; and it is confidently expected that much larger cars will be offered for public service in the near future.

POWER.

Power has already been referred to to ascertain the comparative expenditure in various types of cars commonly in use, as determined by the dead weight and passenger load. This further reference is intended to deal with the power installation, as determined by the nature of the service and conditions incident to transmission.

The recent increase in pressure at which current may be put into the line gives a little more latitude in the matter of drop than was previously consistent in good practice.

Six hundred volts is now permissible, and upon the assumption that motors wound for 525 volts may be worked at 450 volts, we have upwards of 25 per cent. drop in trolley wires and feeders wholly or in part available, according to the relation of cost of energy and cost of copper. This is important to railless traction, since theoretically about four times the amount of copper is needed for railless as compared with tramways if the same losses are held to.

Past practice has held modified views on this point, but in the event of railless being employed for fast services at short headways with heavy cars, the exigencies of such service will necessitate a more accurate balance being struck between the cost of power and the cost of copper. What happens on grades is of interest, as the following notes will show.

The coasting grade for a railless car should be taken at about 3 per cent. to cover variations due to weather conditions and other causes; thus $3 \times 22{\cdot}4 = 67{\cdot}2$ lb. per ton is indicated as the tractive effort due to gravitation pull on this grade, the equivalent of which must be supplied by the motor equipment on the level to overcome resistance to traction, and it might be assumed that on an undulating or switchback route where the grades do not exceed this figure, the average energy on the round trip flattens out to approximately mean consumption upon a level route, but where the number of service stops necessitates a travelling speed on the level which approaches the maximum allowable, and as it follows that the speeds downhill may not legitimately exceed that figure, the speed on up grades is not to be arbitrarily settled; it is, in fact, controlled by the maximum on level and down grades. It is in such cases that the advantage of the great range of available power on all trolley vehicles is so apparent.

To take a concrete case where a double journey of 5 miles total approximately has 2,600 yards on up grades and 1,660 yards on level or down grades one way, the rise on the home run is 166 ft., or a mean grade of 2·14 per cent, the service has to be maintained with nine cars with seven stops per mile, and lay-over necessitating a 36-minute allowance for the trip. This

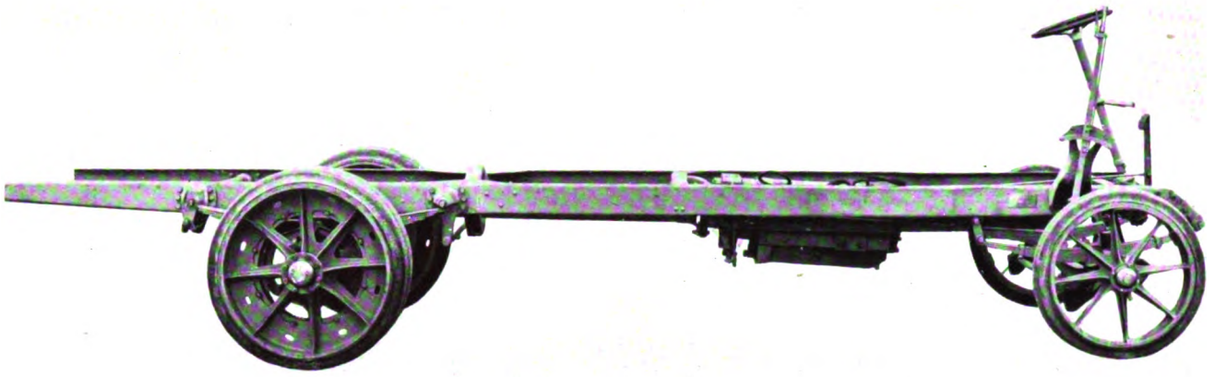

Fig. 7.—Side Elevation of Chassis for 30-Seat Car (Single Motor).

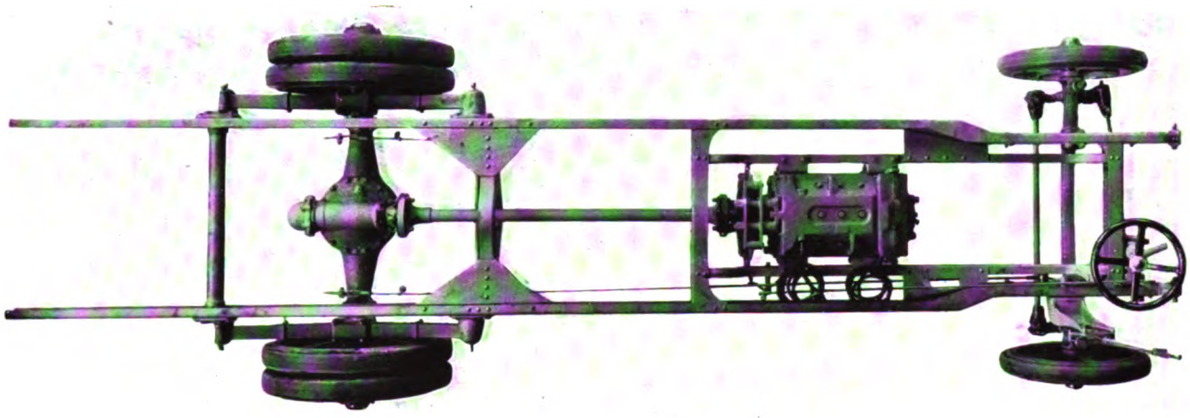

Fig. 8.—Plan View of Chassis for 30-Seat Car (Single Motor).

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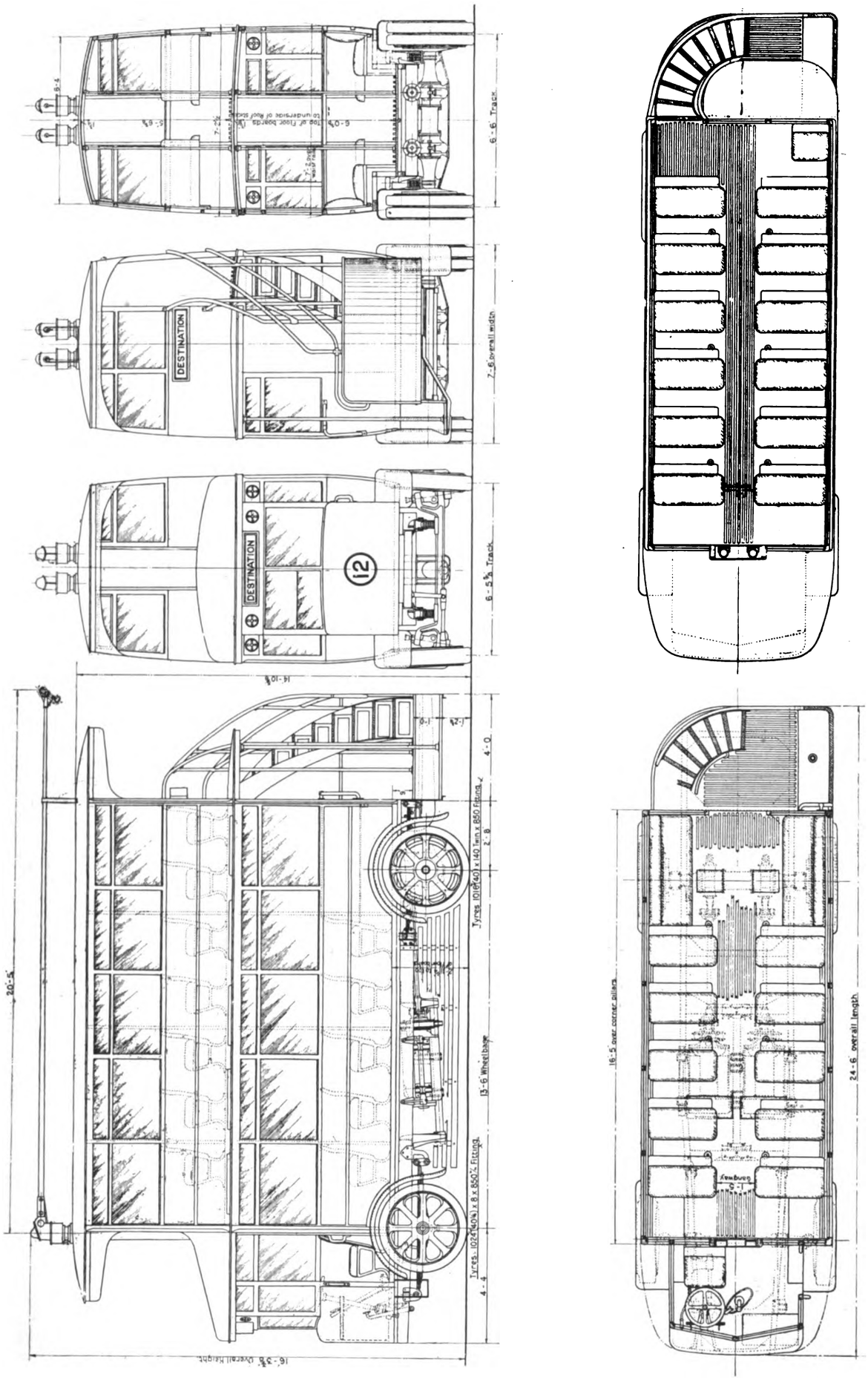

Fig. 9.—Elevations and Plan of Covered Top Double-Deck Railless Car—Birmingham Corporation Tramways.

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equals a mean speed of 16·6 miles per hour on grades. On grades the mean drawbar pull on a railless car, 10 tons loaded, equals 1,180 lb.; the mean drawbar pull on a tramcar of similar capacity with 51 passengers, having a loaded weight of 13¾ tons equals 1,072 lb. Although the resistance to traction for the tramcar is taken at less than one-half of that for the railless car, this close approximation is due to the difference in

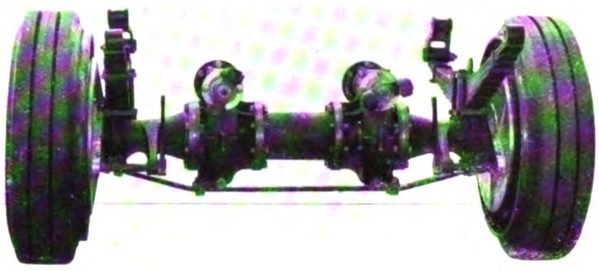

Fig. 10.—Rear Axle for Double-Deck Railless Car with Separate Drive for Each Wheel.

the unladen weight per passenger-seat of the two vehicles.

To accelerate these two cars at 1 ft. per second per second on the 9 per cent. grade, of which there is a short piece, the railless car needs a drawbar pull of 3,416 lb., whilst the tramcar requires a pull of 4,146 lb. Running on the level the drawbar pull for railless car equals 700 lb., and the tramcar 412 lb. On such a route as the one described the energy consumption should not vary much between the rail and the railless car.

With regard to the power actually taken by railless cars, some misconception existed when this form of traction was first projected in this country, it being thought that the increase in energy consumption would be comparable to the increase in the resistance to traction upon the surfaces of public roads over that upon the grooved tramway rails, between which there is a great difference. Whereas the particulars set out in Table II. show that no such differences exist if

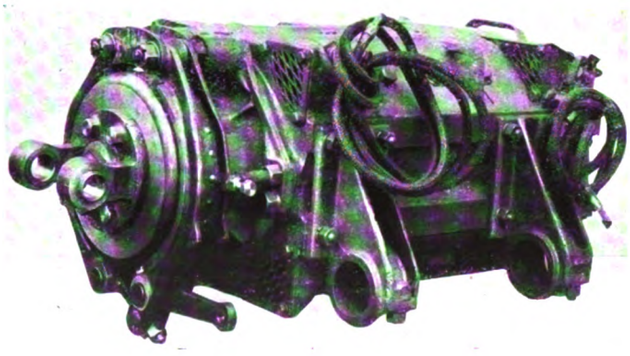

Fig. 11.—Motor for Double-Deck Car with Emergency Brake.

considered upon the basis of passenger miles, which seems a fair method of comparison.

Where a schedule has to be guaranteed and the headway is short, or where energy consumption has to be specified, an ample figure for road resistance should be taken.

The resistance to traction may well be a varying factor as between one route and another, at any rate until roads are constructed upon some standardised plan, and so maintained that the surface can be anticipated to offer a resistance varied only by weather conditions. For this reason, where possible, voltage conditions should be variable between some narrow limit such as may be practicable, although the selection

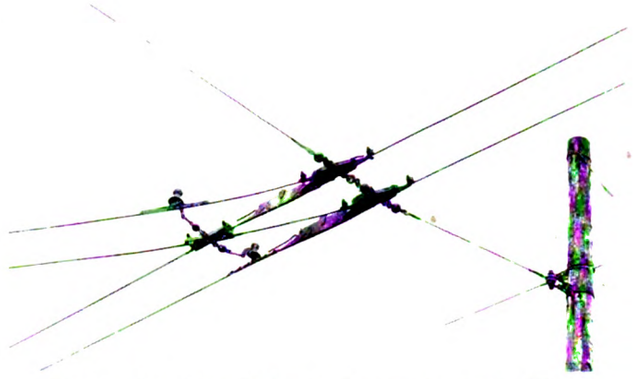

Fig. 12.—Insulated Fitting in Overhead Line to Effect Junction of Closed Loop.

of a sound figure to cover road resistance will always put this matter upon a safe basis.

As these notes do no more than touch upon the essences of railless traction rather from an economic point of view with an engineering explanation than a detailed account of construction, it will suffice to make only a brief reference to overhead line equipment. This is on all fours with that used for tramways. The apparent difficulties of running an earthed negative through complexities of 550 volt positive wires were not so real as they looked. Two-pole overhead line can be constructed with the same facility as the single-pole overhead line in tramways by due observance of a few essential matters.

Fig. 13.—Cam Controlled Trolley.

Fig. 12 has been introduced here to show an insulated overhead line fitting designed for effecting the junction of a closed loop where the polarity was of necessity changed. The inner or near wire being positive returns by way of the other side of loop, and makes a junction with the further and negative wire.

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This fitting was erected for test over a 1-in-9 grade, and a car weighing 8 tons was driven up this grade past the junction on to the main line without the controller being shut off; no arc was drawn over the fitting, and repeated trials failed to damage it. The normal gauge of break on the wires was not varied and a quite inconsiderable length only made dead, as illustrated in Fig. 12.

As to current collection, contact with both wires can be maintained with any well-made trolley of a suitable form up to deviations of say 10 ft. at moderate speeds with adequate upward pressure on trolley wires.

For wider reach-outs a special trolley has been designed (Fig. 13) to operate with poles at right angles if necessary at any speed without de-wirement and with low upward pressure on trolley wires; e.g., used with 20 ft. poles, 17 ft. or more on either side of the trolley wires can be reached with ease, giving free control of a 40 or 41 ft. road. This is all the mobility required of any route-bound vehicle. By this means an oncoming car can pass any slow-moving or stationary vehicles, if necessary running as much as 34 ft. away from the kerb of footpath, according to the relative

Fig. 14.—Front and Side View of Bloemfontein Car.

situation of overhead wires; also these deviations can be made acutely if so required. Hitherto such wide reach-outs have not been necessary, but with the employment of railless in the main thoroughfares of big cities more scope will be required in this direction.

CONCLUSIONS.

In general the characteristics of the railless car appear to be—

(1) Low dead weight per passenger.
(2) Low cost for energy per passenger mile.
(3) High average speed.
(4) Low capital charges.
(5) Low operating costs.
(6) Ability to operate on heavy grades.
(7) High overload capacity.

These advantages may not appear in violent contrast when compared with those of other systems of road transport in every case, but it seems certain they will exist in some degree between wide limits of application. Whether or not that degree warrants the adoption of this form of traction is matter for consideration after careful scrutiny of all the local conditions.

It is hoped these observations will promote discussion. Endeavour has been made to show the railless car in what is believed to be true perspective, and to indicate the grounds for its claims to usefulness between the heaviest traffic and the service which will not pay for overhead line equipment.

In conclusion, the author acknowledges the valuable assistance derived from the particulars embodied in Tables I. and II. received from Mr. A. L. C. Fell, the general manager of the London County Council Tramways; Mr. R. H. Wilkinson, the general manager of Bradford Corporation Tramways; Mr. Sykes, the general manager of Rotherham Corporation Tramways; and Mr. A. C. Baker, the chief engineer of Birmingham Corporation Tramways. and also the drawings and photographs lent by Messrs, Railless, Limited, London contractors for railless electric installations.

MODERN IMPROVEMENTS IN ROLLING STOCK.*

By C. J. SPENCER, O.B.E., M.I.E.E., M.Inst.T.

My hearers will probably remember that at a conference of this Association held in London in July 1920, I had a little to say on the question of improvements in tramway rolling stock as a result of my recent visit to the United States of America, and whilst I did not find anything like unanimity of opinion on the questions then raised, it is gratifying to know that my somewhat provocative remarks have been noted and quoted for various purposes. Let the above stand by way of introduction to the subject which I have the honour to introduce for discussion to-day.

I am afraid that a "candid sceptic" might say that the title of the paper is a misnomer; that no such thing in reality exists; that there have not been any improvements in tramcar rolling stock since about 1900 or a little earlier, about which date the electric car became a common sight in the streets of almost all our large towns and cities. At any rate, the few new cars that have appeared in the post-war period do not differ vastly from the cars of the pre-war period. I am sure you will agree that the above remarks represent the facts, and that for some strange reason the cars of to-day, with the exception of some very minor details, are almost exactly of the same type as those manufactured and put into service some 20-25 years ago.

What, however, is perhaps even more important than the statement of the layman that the cars appear to be the same; they are, in fact, the same, and the detailed mechanism, with perhaps some notable exceptions, is very much as it was. In a word, the expert fully confirms the observations of the man in the street.

The above, whilst being generally true of this country, cannot be said to be absolutely true of some foreign systems, but that was fully discussed at the Congress previously mentioned.

The question then arises—Have we in this country a good and satisfactory explanation of this extraordinary state of affairs?

I suggest that investigation of the subject might proceed somewhat upon the following lines—

(1) Was the design of tramcars 25 years ago so excellent and perfect that nothing further can be done in the way of improvements?
(2) Is there some unsurmountable obstacle (technical or otherwise) to radical improvement?

* A paper to be read at the Congress of the Tramways and Light Railways Association.

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(3) Have we come to the conclusion that the tramcar is a thing of the past, and that a rubber-tyred vehicle, as contrasted with a rail-borne vehicle, is so greatly superior for street transport purposes that it is waste of time further to develop the rail-borne variety?

Dealing with the above seriatim, I am sure the answers to (1) and (2) are in the negative.

I am afraid that (3) cannot be answered quite so readily, and it is necessary to go into some detail.

The development and improvement of the rubber-tyred vehicle during the last ten years has undoubtedly modified the views of transport men. There are many routes where to-day the traffic is handled by tramcar which could be operated, to say the least, to greater public advantage by rubber-tyred vehicles, and, under some circumstances, more economically, whether the rubber-tyred vehicle be of the self-contained or of the railless trolley type. On the other hand, there are in many districts other circumstances where a large vehicle carrying anything from 70-100 passengers, and necessarily rail-borne, is required to deal adequately with the traffic. In fact, even with vehicles of this capacity peak load traffic is not satisfactorily handled, and much larger units are required.

It is impossible, of course, to dogmatise on the possible development of the rubber-tyred steerable vehicle capable of carrying, say, 150 to 200 passengers, but without going into further detail I venture to say that, as far as one can see, the limits to the possible capacity of a rubber-tyred, road-borne vehicle are not so great as those of a rail-borne one.

The question, however, is a two-fold one. With a certain critical density of car-miles per mile of route the total cost per car-mile (including capital charges) per passenger carried is less with a rail-borne than with a rubber-tyred vehicle. There are great economic advantages in a system where heavy loads are carried on a steel rail with power supplied from a central station using home-produced fuel as contrasted with a system of carrying a power station on each vehicle.

This interesting phase of the question could, of course, be pursued much further, but this is a paper dealing with tramcar rolling stock, and is not primarily concerned with the merits of any particular vehicle, except in so far as the question arises as to whether the rail-borne street vehicle has a future at all.

In dealing with question (3) I believe that in the view of many transport men, both tramway and otherwise, the tramcar is by no means obsolete, and therefore time would not be wasted in considering the possibilities of improvement and development. It would, however, I venture to submit, be perfectly true to say that improvements in tramcar design and methods are urgently necessary if the tramcar is to retain even its present position in street transport. I think we may take it for granted that improvement in tramway rolling stock is not only possible, but desirable, so we may proceed to examine some of the points which certainly require consideration.

The man in the street will tell you that the tramcar is a noisy and from a modern point of view a slow, cumbersome and altogether inconvenient means of travel.

Elimination of Noise.

There is no doubt that a steel wheel running on a steel rail must inevitably create more noise than a rubber-tyred wheel on an ordinary road surface, but I am not sure that we need have as much noise from this source as we have to-day. Can it be said that we have given full consideration to the merits of a wooden foundation as contrasted with a concrete foundation, with a paving substance of wood or otherwise, with the object of deadening wheel and rail noises? A wooden sleeper-borne flexible track is certainly superior to the ordinary concrete bed from the point of view of quiet running. I would recommend any tramwayman who has not had experience of open wooden sleeper track to observe the immediate silencing of the tramcar when it leaves the hard concrete foundation for the sleeper construction on a private right of way.

On the other hand, with the obligations of the Tramways Act of 1870 as to the keeping of a perfect road surface, a rigid bed seems to be the only possible course. The legislature of this country imposed a heavy burden on tramways when Section 28 of the Tramways Act 1870, was enacted, or, what is more important, the literal and microscopical interpretation of the section by the Courts. In effect it means that the operators of a tramway, whilst having a statutory right to lay and use a steel rail in the public highway, must maintain the surface of that highway so that vehicles using the same should not in the least degree be prejudiced, even though the owners of such vehicles make no attempt to adapt the wheels to the new conditions, and the result has been the adoption of a hard, non-flexible and noisy track.

I am not sufficiently acquainted with the tramway law of other countries to say whether these conditions are altogether peculiar to this country, but I can say from observations in the United States that any attempt to achieve the impossible, i.e., introduce a light railway on the highway without impairing the surface, is not undertaken.

Design of Vehicle.

Regarding the vehicle, what attention has been given to the elimination of unsprung weight? For example, the wheels, axles, axle-boxes and half the weight of the motors represent a dead weight of 4,700 lb. on an ordinary 4-wheel 50-passenger car, and this unsprung weight is hammering on a rigid base in some cases at a speed of 20 miles per hour or more. No wonder that great damage is done to joints, points and crossings, accompanied by a terrific banging and clanging, which is at times a feature of the progress of a tramway car.

Is not this phase of the subject worthy of the serious consideration of tramway engineers? Could not a great proportion of this unsprung weight be converted to sprung weight? In connection with this, I would invite the attention of tramway engineers to the achievement of the automobile engineers, who have managed to cut down unsprung weight to a very small amount. How far could the present weight of axle and wheel necessary for the strain which the vehicle has to carry be reduced if some of the modern high tensile steels or other metals were employed, and a really scientifically designed wheel and axle adopted? How far is it necessary to carry more than half the weight of the motor with heavy gears on the car axle, and how far would it be feasible to carry the motor as sprung weight driving the car axle by some other means than a spur gear, with the consequent abandonment of the noisy and heavy spur gears?

This also opens up the possibility of higher speed motors (in consequence of higher gear ratios), which means lighter machines, and it should also mean

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cheaper machines to manufacture. Some progress has certainly been made during recent years in the direction of lighter motors, but we are not yet near the limit of possibilities. A well-known firm of motor omnibus builders are to-day employing an electric motor on their vehicles of a total weight of under 25 lb. per H.P. output, whereas the lightest tramway motor I know weighs about 70 lb. per H.P. output.

Designs of a motor as low as 20 lb. per H.P. output have recently been considered by my companies. This question of weight is extremely important from almost every point of view, and I feel confident that satisfactory results would be achieved if the problem was tackled in a scientific and thorough manner.

How far is it possible to introduce some non-conductor of sound and vibration between the tyre and the wheel centre or between the wheel centre and the axle? Difficulties are sure to be encountered, but if by some means we could isolate the short vibrations (noise) inseparable from the running of a steel wheel on a grit-covered steel rail we should kill two birds with one stone. Noise would be largely eliminated, and the premature destruction of many parts of the equipment by short wave vibration would be obviated, with a consequent reduction of the repair account, which is of paramount importance.

It is interesting to note in connection with the above that the first electric cars that were run in this country, viz., on the Blackpool Electric Tramways, opened in 1885, to which system I had some attachment as a boy, the motors were attached to the car body, the drive to the axle being by means of a double-reduction spur gear and an endless chain, and whilst this design had its crudities and was by no means ideal, I can say that the cars certainly ran very much sweeter, apart from the spur gear, than most of the cars of to-day; in fact, with a well-meshed spur mounted on the body the car was nearly noiseless.

Speed.

There is, of course, a limit to maximum speed in the public highway, beyond which it is not safe, but that maximum in its turn is governed by the time taken to bring the car to a standstill without unduly straining the equipment or the passengers in the process. I need not elaborate this point.

Deceleration.

The whole question turns on the employment of power brakes as contrasted with our present very unmechanical hand brake, first used, I believe, on Roman chariots. A deceleration of from 4 to 6 feet per second per second is a practicable proposition, and a rate at which cars could be brought to a standstill in a very short distance without inconvenience to passengers. This, together with better acceleration, would give an improved return to the undertakings, better service to the public, and lower working costs on account of a higher average speed. This question of average speed has never, in my view, had the attention it well deserves. An average speed of 7 to 7½ miles per hour is quite common, but it is in reality a poor performance for a vehicle with an almost unlimited amount of power at its disposal. This is a matter that has had some attention on the undertakings in London, and it might interest the members to know that the M.E.T. Tramways, for example, has an average speed, including all lay-over time, of 9·19 miles per hour, with consequent beneficial effects on costs and usefulness of service, but I think even that figure could be improved with newer equipments without increasing the maximum speed.

Acceleration.

The present acceleration of a tramcar is admittedly not inseparable from jerks. A steady high rate acceleration is very desirable, providing it is steady, but the present method of series parallel control does not lend itself to this desirable feature. I am not sure that we have not overrated the advantages of the series parallel control, and I would suggest that the subject of shunt motors with an even acceleration capable of running at any economical speed up to the maximum is worthy of consideration, with the possibilities of regeneration of current. Regenerative control was, in my view, just a little ahead of time. I had some very interesting results from experiments with Mr. Raworth's system some years ago. From the operation side the system was successful and practical in every way. The net current consumption of the cars fitted with this control was from 25 to 30 per cent. less than the ordinary equipments, but the motors would not stand up to the continuous work, and consequently they became overheated. Since then, as previously stated, motor design has improved, and what was impossible in, say, the year 1908, may be quite feasible to-day, with ventilated and inter-pole motors.

Again, it is interesting to note that the motors of the Blackpool Electric Tramways were shunt motors, and were quite unsuccessful, because little or nothing was known then about commutation poles or ventilated motors. These motors were quite impossible with a brass brush fixed to a steel plate on the commutator. Later they were converted to series motors with carbon brushes, and the author claims, with due modesty, to have introduced carbon brushes to motors for the first time, so far as he knows, on the Blackpool Tramways about the year 1888. Shunt motors were then therefore a failure, but they have so many advantages in certain directions that the subject is certainly worthy of consideration in the light of present knowledge.

Allied to this subject of speed control, I must mention a recent development of considerable value, viz., the use of contactors in the place of direct control of current from the platform. The present "box of tricks" on the car platform has continued too long a feature of every tramcar, and I welcome the efforts of certain eminent manufacturers to get rid of complications and substitute simplicity. Field shunting for control again comes well into view in consequence of commutation improvement, and the combination of all these new ideas should result in greatly improved and more economical service.

Collector Gear.

The present trolley pole, so common throughout this country, has always appeared to me to be about the most unmechanical and absurd piece of mechanism it is possible to imagine, but its present form is exactly what it was when, as a youth on the South Staffordshire Tramways, I had, with others, the honour of assisting Mr. Alfred Dickinson in the design of a swivel trolley head. Recently some slight advance has been made in the adoption of sliding heads instead of wheels, and whilst I am aware that this is a subject on which a special committee of the Association is reporting, and on which much diversity of opinion exists, I append a summary of reports of the various departments on

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the results of experiments carried out on the lines of one of our companies, which may be of interest—

SUMMARY OF REPORTS ON EXPERIMENTS WITH SLIDING TROLLEY HEAD ON THE METROPOLITAN ELECTRIC TRAMWAYS.

"The Traffic Department report that the sliding head has certain advantages over the trolley wheel from the running point of view, as it dewires less frequently, but in the event of dewirement it is not so readily replaced on the wire as the wheel.

"The Rolling Stock Department state that the skid has an advantage over the trolley wheel from the upkeep point of view, as not only has the cast-iron skid a considerably longer life than the wheel, but the maintenance of its parts is much less, and therefore it does not need the same attention.

"The Claims Department report that during the period of the tests, from December, 1921, to April, 1922, inclusive, the average number of dewirements was as under—

No. of dewirements per 10,000 miles' run—

Cars fitted with skids	1·49
Cars fitted with wheels	2·35

Further, the sliding head, owing to its lightness and the fact that it is not liable to foul the overhead equipment on dewirement, does not result in the same amount of damage as the wheel.

"On the other hand, the Overhead Department report that the wear and tear of the trolley wire with this type of head is about double that of the trolley wheel, but they have hopes of being able to reduce this by the adoption of more suitable material, or means for lubricating the wire."

Nothing exceptional in the way of improvement is here shown, but I do believe that if we could get the right type of designer and some insistent demand from tramway managers for better collector gear something would soon appear.

CAR BODIES.

Dealing with the carriage work of the car, I think much could be learned by studying the latest methods of body construction employed by motor omnibus builders. The body, like the rest of the equipment, should be scientifically designed, the main object being to cut down weight. The rule of thumb method of putting in heavy steel girders wherever some weakness has been detected might with advantage be reconsidered, and possibly something could be designed which would less resemble a box on wheels and embodying features which would make for popularity, and, in the long run, profit.

The design of a car body is very largely governed by the system of fare collection adopted, and I believe that this question needs the close consideration of tramway operators. There is undoubtedly a great leakage in revenue due to either non-payment or insufficient payment of fare, and under present conditions, where a conductor is acting not only as fare collector but as a general porter and attendant, doing his work often under very difficult circumstances, to say nothing of the want of incentive to get every fare, and the proper fare, considerable inefficiency prevails.

"Pay as you enter" or "pay as you leave" is, as is well known, almost standard practice in America, and the reasons why this system has not become common in this country are fairly well known. The critic will say that "pay as you enter" has been tried in this country and found a failure, owing to the zone fare system as contrasted with the flat fare system and the coinage and change difficulty. There is a great deal of truth in this, but can it be said that everything has been done to make "pay as you enter" possible?

In connection with the development of the one-man car on the London United Tramways, we have of necessity had to give close attention to the possibility of the fare transactions taking place on the platform, and have called to our aid several pieces of fare-collecting and ticket-issuing machinery which it has occurred to me might be of interest to the members of this Congress. I do not suggest that the exhibits before you of the Shanklin ticket-issuing machine or the coin-changing machine and the fare-box represent the last word in efficiency, but I do submit that the use of machinery considerably simplifies the fare collection problem. I do know that I have every experienced tramway manager with me when I suggest that if tramway undertakings were successful in getting the correct fare from every passenger the revenue of our undertakings would be beneficially and appreciably improved.

GENERAL.

The foregoing remarks about tramcar design generally are, I am afraid, somewhat in the nature of desultory observations, and more critical than constructive. My object will have been achieved if those who are responsible for producing new ideas will note the trend of desirable evolution, and appreciate the fact that tramways will only become obsolete when new designs for tramcars have become impossible. I cannot but feel that if the tramway industry had had the benefit of the almost Herculean efforts of the automobile engineer during the last ten years we should have been running to-day a much more up-to-date type of vehicle and with considerably better results.

It is somewhat lamentable, but none the less true, that what we require to-day was in reality invented many years ago, was tried and abandoned, generally because the inventors were a little ahead of their day, and if one might discreetly express an opinion the tramway manager is prone to lose heart in a new thing if immediate success is not attained. New ideas have generally got to go through their teething period, and early designs are generally crude. If, however, we would only condemn those ideas that are fundamentally wrong and struggle with those that are only wrong in some detail, I believe great progress would result.

The one-man car, which is so popular in the States, was, I believe, first tried in this country and abandoned. Regenerative control was tried here, but did not flourish, and so it might be said of many other new ideas not only affecting the tramway industry. The ideals of the early inventor are generally ahead of immediate practicability, but it is often worth while to review some past failures and hopeful attempts in the light of new conditions.

RAILLESS TRACTION AT LEEDS.

RESULTS OF THE PAST YEAR'S WORKING.

The following information relating to the railless traction installation of Leeds City Tramways is extracted from the annual report for the year ended March 31, 1922. The length of route now open amounts to 8 miles, 5 furlongs, and there are 10 cars in stock. During the year 206,758 miles were run, and 1,033,507 passengers were carried, averaging five per car-mile. The receipts amounted to £13,344, or an average of 15·49d. per car-mile. The working expenses were £11,937, an average per car-mile of 13·856d. The working expenses per passenger were 2·772d., and the ratio of working expenses to receipts 89·45 per cent.

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BOURNEMOUTH CORPORATION TRAMWAYS.*

By I. Bulfin, B.A., A.M.Inst.C.E., M.I.M.E., M.I.E.E.
(*General Manager.*)

In giving an account of the Bournemouth Corporation Tramways it is as well to start with the fact that the Bournemouth Corporation never wanted tramways in the borough. They opposed all applications that were formulated and ultimately tramways were forced upon them. This fact will explain some of the many difficulties that were experienced in Bournemouth.

The British Electric Traction Company in the year 1899 obtained their Light Railway Order for the construction of 3¾ miles of railway in the Poole area, i.e., from the County Gates, Bournemouth boundary, in a western direction to Poole station and opened this line for traffic in 1901. In the year 1900 the same company promoted a Tramways Act (Christchurch and Bournemouth Tramways Act, 1900) for a tramway connecting Bournemouth and Christchurch in an easterly direction. This latter Act included the tramway from the Hotel Metropole to Pokesdown Station in the Bournemouth area. The Bournemouth Corporation, in view of the B.E.T. Co. holding the light railways on the western side and their endeavour to obtain a tramway concession on the eastern side and partly in their borough, determined to apply to Parliament (as a blocking measure) for a Tramways Bill for their own area, and promoted in the same year the Bournemouth Corporation Tramways Order 1900. Parliament granted powers to the Bournemouth Corporation to construct the lines in their own area, and the line Metropole to Pokesdown in the B.E.T Co's. Act was held in abeyance subject to the Bournemouth Corporation constructing the line within two years. The Bournemouth Bill was only a blocking measure and the scheme was for a single line and passing places on the whole of the main route. In view of the fact that if the tramways were not constructed within two years their powers lapsed and a company had powers to run tramcars in the Bournemouth area, it became necessary to reconsider the whole scheme and to arrange for a double line right through. This necessitated the widening of roads, compulsory powers for acquiring lands and the preparation of plans and contracts for a large system, including depots, generating station, etc. The delays occasioned by these alterations and in obtaining the necessary powers resulted in the two years expiring before substantial progress was made, with the result that in 1902 the B.E.T. Co. issued an injunction against the Bournemouth Corporation constructing these lines as their powers had lapsed, and by an order of the Court of Appeal, dated July 15, 1902, this injunction was upheld. In order to retain the tramways in their own area it became necessary to buy out the B.E.T. Co., both on the Poole and Christchurch sides. The case went to arbitration and a price was fixed and agreed. Owing, however, to trouble with the Dorset County Council, it became necessary for the Poole Corporation to buy the Poole line and they leased these lines to Bournemouth for a period of 30 years, the Bournemouth Corporation agreeing to pay as rent a sufficient sum per annum to pay interest and sinking fund on the purchase price and at the expiration of the 30 years' lease the Poole Light Railway would become the property of the Poole Corporation free of all costs.

The Poole Corporation, in leasing the Light Railways to Bournemouth, imposed a large number of conditions which were embodied in the Bournemouth Corporation Tramways Act 1903 and which became later a source of continual trouble and friction, one condition being that the Bournemouth Corporation should not charge higher fares in Poole area than the B.E.T. Co. were charging in 1903. This condition placed Bournemouth Corporation in the position of not being able to make use of the Tramways (Increase of Charges) Act until March, 1921, when the Bournemouth Corporation undertook to take over the whole of the outstanding loan charges on the Poole undertaking. The amended Bournemouth scheme for tramways was for a double line of tramways through the whole of the main route run on the trolley system, but in the centre of the town they decided to instal the conduit system (being equal to a length of some 2¾ miles of single track). The system was side slot running to centre slot at all special work, identical in every way with the centre slot London County Council system, but laid and run prior to the London County Council system.

Permanent Way.

The conduit system was run for some ten years when, owing to heavy wear of rails and conductor tees, it became necessary to relay this portion of the line. In going into the cost of renewal either as a conduit system or changing over to the trolley system, it was decided after very careful consideration of all the points in question to abandon the conduit and run the entire undertaking on the trolley principle. The main lines in Bournemouth were opened to traffic in 1902 and the side routes in 1903. The tramway to Christchurch was constructed by the Bournemouth Corporation and opened for traffic in 1905, and in the construction of this line it became necessary to buy out the Toll Bridge Company at Tuckton Bridge over the River Stour (a narrow wooden bridge on iron piles some 380 feet long). This bridge was pulled down and a ferro-concrete bridge erected—one of the first and longest ferro-concrete bridges in England carrying a double line of tramways. In 1906 the Lower Parkstone line was laid and opened for traffic. At the present time the route mileage of the system is some 23 and the length of single track over 33 miles and runs in three boroughs —Poole, Bournemouth, and Christchurch.

The permanent way laid prior to 1912 had fish-plated anchored joints and the average cost per mile of single track with wood block paving was between £5,000 and £6,000. Between 1912 and 1915 some 12 miles were relaid with Thermit joints and transverse sleeper construction, the sleepers consisting of the old rails cut into lengths of 5 ft. 4 in. and clipped to the new rails every 5 ft. apart, the average cost per mile of single track with wood block paving being between £6,000 and £7,000. In 1920, 1921 and 1922 some 12 miles of single line were laid with transverse sleeper construction every 5 ft. apart and Thermit joints and B.R.C. reinforcement, the cost per mile of single track with wood block paving being between £18,000 and £19,000. Corrugation has been very prevalent all over the system and up to 1919 the only method of dealing with this was by means of a track grinder. In 1918 about seven miles of track were treated by the Sorbitic in-situ process and the result has been most satisfactory in every way. I unquestionably

* A Paper to be read at the Congress of the Tramways and Light Railways Association.

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hold that this is the only method I have found to prevent a recurrence of this evil and when the financial position is more satisfactory I intend treating all relaid portions of the track in the same manner.

POWER SUPPLY AND ROLLING STOCK.

The current for the tramways in the Bournemouth area is supplied from the Corporation station. The plant consists of four Lancashire boilers with mechanical stokers, four Belliss and Morcom triple expansion engines 500 to 600 H.P. each, coupled direct to four B.T.H. multipolar dynamos. The condensing plant was supplied by Messrs. Belliss and Morcom. There is sufficient room for the equipment of a further 50 per cent. increase of plant in the station. The whole of the water supply is obtained from an artesian bore 300 ft. deep and the water is raised by compressed air, steam and electricity. The current in the Poole area and the Christchurch section is supplied by the Bournemouth and Poole Electric Supply Company, Limited, owing to prior contracts entered into by the B.E.T. Co., which the Bournemouth Corporation had to accept when taking over the tramways.

There are four depots and car sheds situated in different parts of the sytem, the main depot and repair shops being at Southcote Road. The new depot at Moordown is an example of the use of old rails in building construction. There are six tramway shelters installed on the system. The rolling stock consists of 112 cars—67 bogie and 45 single trucks. The equipments are British Westinghouse and British Thomson-Houston. Magnetic track and rheostat brakes are installed on all cars. The brakes on the Bournemouth Corporation Tramways are peculiar to the system and were designed and supplied by the British Westinghouse Company. These brakes are combined magnetic and track, and can be applied either electrically or by hand. They are very complicated and maintenance and upkeep is very heavy. The maximum gradient is 1 in 12 and the sharpest curve some 40 ft. The gauge is 3 ft. 6 in. throughout the system. The gauge gradients and curves preclude the possibility of the use of top-covered cars.

It may be of interest to members to know that in Bournemouth the capital charges work out at over 9d. per car-mile and that the financial position of the undertaking is dependent entirely on visitors. A surplus is made from April to September in each year sufficient to meet the loss of running between October and March and in some cases to leave a surplus balance at the end of the year. As instancing the growth of tramway traffic, particulars of yearly returns of 1903 to date are given hereunder—

One of the New Cars of the Bournemouth Corporation Tramways.

Year	Passengers Carried	Traffic Revenue	Car Miles	Working Expenses	Surplus
		£		£	£
1903	3,073,450	17,637	324,650	8,720	4,826
1904	9,363,985	52,445	1,002,163	29,810	4,807
1905	10,058,288	55,276	1,121,623	33,500	7,918
1906	12,617,927	73,094	1,494,261	44,062	6,416
1907	13,503,610	83,663	1,765,098	53,598	806
1908	13,991,328	86,024	1,766,068	53,163	385 Def.
1909	13,735,267	82,017	1,748,515	55,680	5,416 Def.
1910	14,010,647	85,684	1,794,997	55,901	1,755 Def.
1911	14,703,679	89,569	1,784,249	57,717	130 Def.
1912	15,121,935	91,421	1,844,507	54,841	3,379
1913	15,750,576	95,694	1,822,054	52,293	10,478
1914	17,182,844	104,353	1,962,352	59,011	15,070
1915	16,967,210	101,882	1,815,632	55,066	9,083
1916	17,577,580	107,575	1,670,702	51,794	14,057
1917	17,947,463	113,518	1,634,640	53,711	16,275
1918	20,454,597	131,673	1,657,852	62,650	26,329
1919	20,769,507	148,449	1,374,411	73,980	29,599
1920	27,080,255	188,739	1,684,874	114,271	32,729
1921	27,403,621	195,468	1,857,576	152,027	17,006 Def.
1922	24,271,692	206,257	1,684,513	146,161	98

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The Bournemouth Corporation Tramways are worked under the following Acts—Bournemouth 1900, Christchurch and Bournemouth 1900, Bournemouth Corporation Act 1901, Bournemouth Corporation Act 1903, Bournemouth Corporation Act 1904.

STATISTICAL INFORMATION FOR THE FINANCIAL YEAR ENDED MARCH 31, 1922.

Capital Expenditure—	
Bournemouth and Christchurch Tramways ...	£705,000
Poole Tramways, leased to Bournemouth Corporation	£130,330
Track mileage	33
Population served	140,000
Traffic revenue	£206,257
Total revenue	£207,356
Working expenses	£146,161
Gross balance	£61,195
Net revenue, additions to gross balance	£3,758
Total gross balance	£64,953
Interest on capital and sinking fund	£49,586
Rent of leased lines	£10,961
Other net revenue charges	£4,248
Total net revenue charges	£64,795
Net profit, tramways	£158
Net loss, motor omnibuses	£60
Net profit on undertaking	£98
Car-miles	1,684,513
Passengers carried	24,271,692
Units per car-mile	2·04
Percentage of working expenses to receipts	70·48
Average traffic revenue per car-mile	29·38d.
Average traffic revenue per mile of track...	£6,284
Average fare per passenger	2·03d.
Number of cars in stock	112

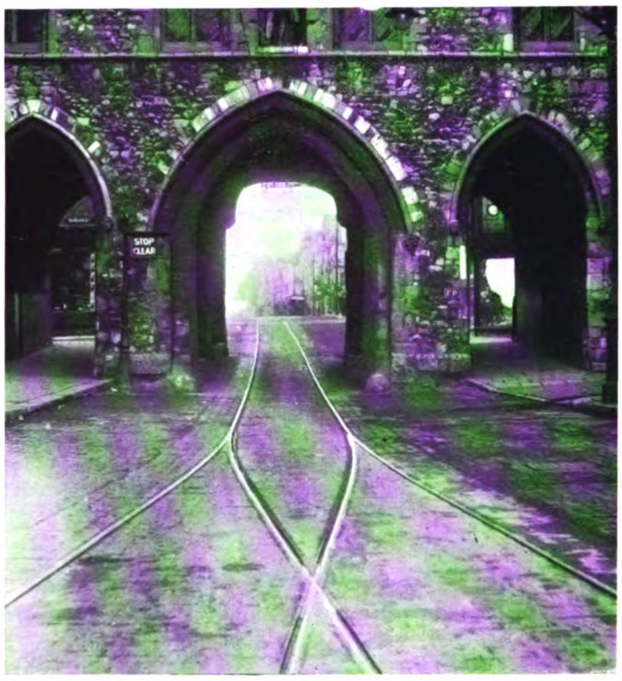
MANGANESE RAIL WELDING AT SOUTHAMPTON.

An interesting example of electric arc welding was recently carried out at Southampton, under the supervision of the general manager and engineer of the Corporation tramways, Mr. James Dobson. Visitors to the town are acquainted with the old Bargate which exists in the centre, and which is illustrated in one of the accompanying photographs. The Bar is

Turnout Under Construction at the Bar Gate.

of great historical interest, but its builders did not foresee that one day it would have to accommodate itself to the requirements of an electric tramway service. Not only is it so low that cars have to be specially built to pass underneath, but it is only wide enough to allow for a single track through its portal. The service is a busy one, cars passing in each direction on an average of one every 30 seconds during rush hours, in addition to heavy ordinary road traffic. It is therefore easy to understand that ordinary rails do not have very long life; in fact they have had to be renewed every seven or eight years in consequence, at very heavy cost, and with great inconvenience to the town generally.

With the idea of avoiding this periodical trouble, it was recently decided to re-lay the whole length of the



New Turnout and Track at the Bar Gate.

single route under the Bar, together with turn-outs and points at each end, in manganese steel. This work has actually been accomplished, and constitutes perhaps the longest length of solid manganese trackwork in the country. The whole of the rails have been supplied by Messrs. Edgar Allen and Company Limited, of Sheffield. It is expected that they will last for from twenty to twenty-five years, and in consequence should prove considerably cheaper in the long run, apart from the fact that their use obviates recurring inconvenience to the public.

Perhaps the most interesting portion of this work is the fact that electric arc welding has been solely used in the building up and attachment of the joints. The method adopted has been the use of high carbon steel fishplates of ordinary form. These are secured by bolts in the usual manner, together with a seam of electric arc welding along the top and bottom edges. Underneath the joint there is a sole plate of the same material, which is also welded solid in position. It was at first thought doubtful whether the high carbon steel plates could be effectively welded to the manganese rails. However, after consultation with the Equipment and Engineering Company, it was decided to use their "K" grade manganese metallic electrodes. The effect was found to be entirely satisfactory, and it is interesting to know that although the two metals were of different melting points, the weld took effective hold, and after preliminary trials was found to be perfect.

The execution of this difficult work reflects great credit upon the welding department of the Southampton tramways and upon the general manager.

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THE EDITOR will be glad to consider articles by experts. All information of a practical character relating particularly to the engineering and operating branches of transportation will receive prompt attention. Original illustrations will also be welcome.

LONDON, JUNE 15, 1922.

The London Transport Congress.

The London Congress of the Institute of Transport may be regarded as a notable step in the growth of this young but energetic body. The amount of interest that it aroused in transport circles in London, throughout the provinces, and even abroad was indicated by the fact that nearly 700 members, graduates and students attended, representing almost every form of locomotion—railway, tramway, omnibus, commercial motor vehicle, water-borne craft, and even aircraft. The Institute of Transport, indeed, embraces in its scope a wider field than any kindred organisation, but in spite of its diversified interests, excellent arrangements were made to meet the needs of practically every individual member. The nine papers that were read, ranging from the design of commercial motors to wireless telegraphy as an aid to transport, expressed the views of men who may correctly be described as experts on their respective subjects. Not only were these meetings eagerly attended, but the lengthy discussions which followed the papers were often as illuminating and interesting as the original contributions themselves. So anxious were some of the lecturers to hear what their audience would have to say that they saved time by delivering a prepared summary of their papers (which, of course, were available in printed form), or extemporised a summary as they went along. As for road transport, it was made clear by several highway engineers that anxiety for the future of our roads is acute. Many theories were advanced as to how the greatest wear and surface corrugations are brought about, and how they can best be counteracted. It was only natural that a corresponding interest should be displayed in the form that future types of motor vehicles will take, the possibilities of pneumatic tyres, and the prospect of six or more wheels being utilised to distribute road friction. One matter on which there was decided unanimity was that the present basis of motor vehicle taxation is unsound and unfair. In view of the fact that at least one member of the Government Committee charged with this matter took a leading part in the proceedings, it is not unlikely that some revision may be effected. The many visits of inspection which the members of the Congress were privileged to make to the transport systems and workshops of various undertakings in and about London proved of especial interest, and were most efficiently organised. The opportunity thus afforded men from widely distant parts of the country for coming together and seeing the inner working of leading transport concerns, and discussing their own experiences, cannot but have been helpful, particularly to the younger members, of whom there were many. The delegates from overseas, who came from Shanghai, South Africa, France, Holland and Vienna, were also impressed with what they saw, and will doubtless have much of interest to relate to their people at home about British transport systems and the hospitality of British transport men.

Abuse of Competition.

Although a reasonable amount of competition in transport may be an advantage to the public, no one will deny that there are circumstances in existence which justify the assertion that a decided misuse is being made of competitive means of transport with tramways. Such a condition arises when members of a public authority are not averse

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from encouraging any sort of applicants for hackney carriage licences to enter into rivalry with a tramway undertaking operated by a company. This procedure is the more reprehensible when one bears in mind that competition by reputable vehicle owners is already in existence. In looking for a possible explanation for extending competition until it becomes an abuse, the cause is soon discovered. It is that in a few years' time the tramway undertaking may be taken over by the municipality if advantage is taken of an impending option to acquire it. To a certain class of Councillor such an opportunity is nowadays too good to be lost. His motive is all too clear. He may imagine that a wholesale depreciation of a company's tramways, aided by the present economic difficulties, may lead to an opening for acquiring the enterprise at scrap value. A word of warning may be uttered to individuals who favour Bolshevist methods being applied to legally constituted bodies carrying on tramways under powers derived from the Legislature. What would be the position of the local authority if the astute business men, who by private enterprise meet the wants of the travelling public, decide to abandon an undertaking? Would not the Town Council be faced by the task of removing the rails at their own expense and reinstating the roadway? Certain it is that they would lose a substantial sum paid in rates on the track, together with the company's outlay for maintaining a considerable area of the roadway. And what is there to prevent the late tramway undertakers from instituting omnibus services, thus compelling a local authority to incur great expense in putting the roads into a condition to bear the extra traffic? There is every encouragement for such a change of traction under the provisions of the Roads Act of 1921. That Act practically takes from provincial authorities the old power of control of their roads. Under that Act any refusal of a Watch Committee to issue licences can be overridden by the Ministry of Transport. That body, it must be confessed, entered upon the task of bringing the whole transport of the nation under their ægis without the assistance of anyone familiar with road traction. Tramway authorities have since found that the results of the Act are proving intolerable, and it is not surprising that their representations, after receiving one rebuff have, in conjunction with other interests, borne fruit. The result is seen in the formation by the Minister of Transport of a committee to consider the use, construction, and regulation of all forms of road passenger vehicles except tramcars and railless trolley cars. Unnecessary competition might well form one subject for consideration.

A New Plea for Tramcar Vestibules.

For some years cars have been operated in the midland and northern areas of the kingdom with the platforms either wholly or partly enclosed by glass partitions. New single-deck cars show that it has become standard practice for platforms to be wholly enclosed. With the introduction of the one-man car on a light traffic line between Kingston and Tolworth by the London United Tramways Company, the wholly enclosed platform has made its first appearance in the metropolitan area. In this case the complete vestibule has to do with the working of the payment-on-entry system and the control of passengers alighting. This dual method of economy will, it is hoped, effect a further saving by eliminating the accidents that arise on the open platform. Hitherto the demand for vestibules has chiefly come from employees on exposed routes in the north. Whether the London suburban innovation will lead to developments in southern England and elsewhere remains to be seen. On climatic grounds there is little justification for vestibules in a considerable portion of the country, but there is a new reason that may possibly be advanced—one that has already been put forward in the midland area. There the managers' and employees' representatives, meeting in the Area Industrial Council, have recommended all the undertakings within the district to adopt the vestibule for all cars. In support of the request it is urged that the dust now thrown up from the roads by motor vehicles affects the eyes and throats of the motormen. This nuisance, we should imagine, is mainly confined to the waterbound macadam roads, for some years must yet elapse before tar and bitumen preparations are universally used on roads not paved with wood or setts. The objection to the

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dust created by motor traffic is certainly one of great importance, both in view of the large increase of such machines and of the possibility that the entry of dust into a motorman's eye may lead to an accident. The midland area does not stand alone as regards the effect on the eyes, for drivers on the London County Council cars may now be seen wearing goggles in order to keep free of dust and grit. If this is the case where the roads are well paved and scavenged, it requires but little imagination to picture the position elsewhere. Possibly the trouble could be overcome by the invention of combined goggles, nose and mouth respirator.

LIVERPOOL PIERHEAD TRAMWAY TERMINUS.

In the illustrated description of the Pierhead terminus of the Liverpool Corporation Tramways, which appeared in our issue of May 18, there was an important omission that we are glad to rectify. It should have been stated that the scheme was originally conceived by the former general manager, Mr. Charles W. Mallins. For years the undertaking had to contend with inadequate facilities at the Pierhead, and from time to time plans had been presented for the purpose of securing an improvement. None obtained the approval of the Tramways Committee until Mr. Mallins developed his scheme for constructing the three large balloons with extensive stand-by accommodation. Mr. Mallins' plan was the result of long study of the problem, and if industrial difficulties had not arisen after the war the work would have been undertaken before his resignation. Now that it has been completed the rearranged and extended lay-out forms a fitting conclusion to the valuable work that Mr. Mallins accomplished for the Liverpool tramway undertaking. It is a matter for congratulation that the carrying out of the scheme was entrusted to a city engineer of the eminence of Mr. J. A. Brodie, whose interest in traffic arrangements is well known.

TRAMCAR CONDUCTOR'S DUTY.

IMPORTANT APPEAL TO THE HOUSE OF LORDS.

A case of much interest to tramway managements was decided in the Appeal Court of the House of Lords on May 26. Lord Haldane, Lord Cave, Lord Finlay, Lord Dunedin, and Lord Wrenbury heard the case. The appellant, John Percy, a printing machine hand, of Glasgow, originally brought the action against the respondents, the Corporation of Glasgow, for damages for false imprisonment, or, as it is called in Scotland, " wrongous detention," arising out of an incident in a tramcar. The Lord Ordinary, before whom the action came in the Court of Session, held that the case, as averred by Mr. Percy, was relevent, and he approved of an issue for the trial of a cause. The First Division of the Court of Session recalled the interlocutor of the Lord Ordinary, and dismissed the action. Against this judgment Mr. Percy now appealed to the House of Lords.

Appellant's case was that in July, 1920, when a passenger on a Glasgow Corporation tramcar, he tendered a penny, said to be slightly marked but not defaced, in payment of fare. The conductor refused to accept the coin, and demanded another, which the man refused to give. The conductor then called a tramway inspector, who repeated the demand for another penny, with the same result ; and on Percy insisting that the coin was good, the inspector and conductor called a police constable, and, as Percy alleged, gave him into custody on the charge of refusing to pay his fare, notwithstanding that he gave his name and address to those officials of the Corporation. Mr. Percy was then, he said, removed from the car by the constable and taken along the public street to the police station. There he was detained for about ten minutes, and then allowed to go on the undertaking to return for further procedure next morning. On the following day he attended at the Police Court, where he was informed that the matter was finished. No proceedings were instituted against him. In these circumstances Mr. Percy raised an action for damages against the Corporation, as being legally responsible for the wrong to which he alleged he was subject at the hands of their servants, claiming £500 and £100 expenses.

The Corporation contended that under their by-laws it was a condition precedent to the exercise by the tramway officer of the power of seizing and detaining a passenger that the name or address of the passenger should be unknown to the officer or servant, and on the showing of Mr. Percy himself, the conductor and inspector acted outside the scope of their employment and authority.

Lord Haldane, in giving judgment, said he was unable to agree with the First Division Court which dismissed the action on the question of relevancy simply. He was of opinion that in the circumstances alleged, the employees were agents " acting within the scope of their agency." He thought, therefore, that the pursuer had on this footing the right to have issues of fact, which appeared to have been relevantly stated, tried out. If that be true the interlocutor of the First Division should be recalled and that of the Lord Ordinary restored. So far as the appeal was concerned, the appellant, having sued *in forma pauperis*, was not entitled to more costs than were usually allowed in such cases. The other Lords gave judgment to the same effect, and the issue will therefore be re-tried.

LONDON UNDERGROUND EXTENSIONS COMMENCED.

A memorandum by Lord Ashfield with reference to the London Underground extensions to be carried out under Treasury guarantee with respect to the capital was circulated on May 26 to the London Members of Parliament. After referring to the original proposals which were declined by the Government in November last, Lord Ashfield gave a summary of the revised scheme with which it has been decided to proceed. This includes (*a*) the Edgware Extension Railway from Golders Green to Hendon and Edgware, a distance of 4¼ miles, with five stations, and (*b*) the connecting railways between Camden Town and Euston, which will enable through services to be worked from the northern branches of the Hampstead line over the City and South London Railway to the Bank and Clapham Common. Provision is also made for station improvements, such as the provision of escalators, and additions to the power plant at Lots Road power-station. The City and South London Company's tunnels will be enlarged and improved to conform with the standard of the other tube railways, and new rolling stock will be provided. Particulars were given of the Treasury guarantee, and the memorandum concluded with the statement that contracts have now been placed for a large part of the work, and operations would commence immediately. The whole of the plant equipment, with the one exception of certain parts of the escalators, will be manufactured in this country.

A beginning was made on June 12 with the work on the Golders Green to Edgware extension, when Lord Ashfield, many of his fellow directors, and several invited guests witnessed the turning of the first sod at Golders Green by Sir Philip Lloyd-Greame, M.P. for Hendon.

BIRMINGHAM TRAMWAYS WAR MEMORIAL.

The memorial erected by Birmingham Corporation tramway employees to their 236 comrades who fell in the war was unveiled on Sunday, May 28. The memorial is an imposing monument erected on the Tramway Stadium, King's Heath. It is 20 ft. high, and is enclosed in a formal garden fenced off from the playing field by a beech hedge. Special cars conveyed some 2,000 tramwaymen, their wives and families to the Stadium. Wearing their medals and ribbons, they formed up in companies, and, headed by the tramways band, marched to the site of the memorial. The procession included the Bishop of Birmingham (Dr. Russell Wakefield), the Lord Mayor (Alderman David Davis), the Town Clerk (Mr. F. H. C. Wiltshire), the chairman (Councillor F. Smith), and members of the Tramways Committee, the general manager (Mr. Alfred Baker), and the principal officers of the department.

Mr. Baker, speaking prior to the unveiling, said that on the outbreak of war no body of men answered to the call of King and country with greater enthusiasm than the Birmingham tramwaymen. In less than a month 600 men, or 20 per cent. of the total number of the employees of the department, voluntarily joined up. Throughout the course of the war the department supplied to the forces 1,800 men. The whole cost of the memorial had been contributed by the men themselves, without any outside assistance whatever, from the Corporation or the Tramways Committee. After the Lord Mayor had delivered a brief address, Lieutenant F. Clarke, M.M., one of the employees of the tramways who gained a commission during the war, unveiled the memorial, which was dedicated by the Bishop of Birmingham. All the cars and omnibuses in service in the city halted for two minutes during the ceremony. A photograph of the memorial we hope to reproduce in a subsequent issue.

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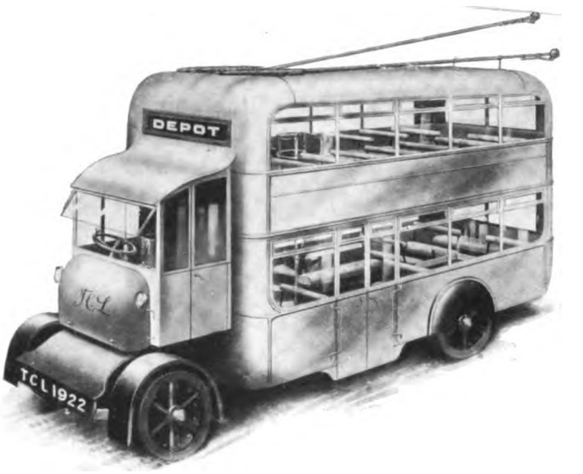
FRONT-DRIVE TRACKLESS CAR.

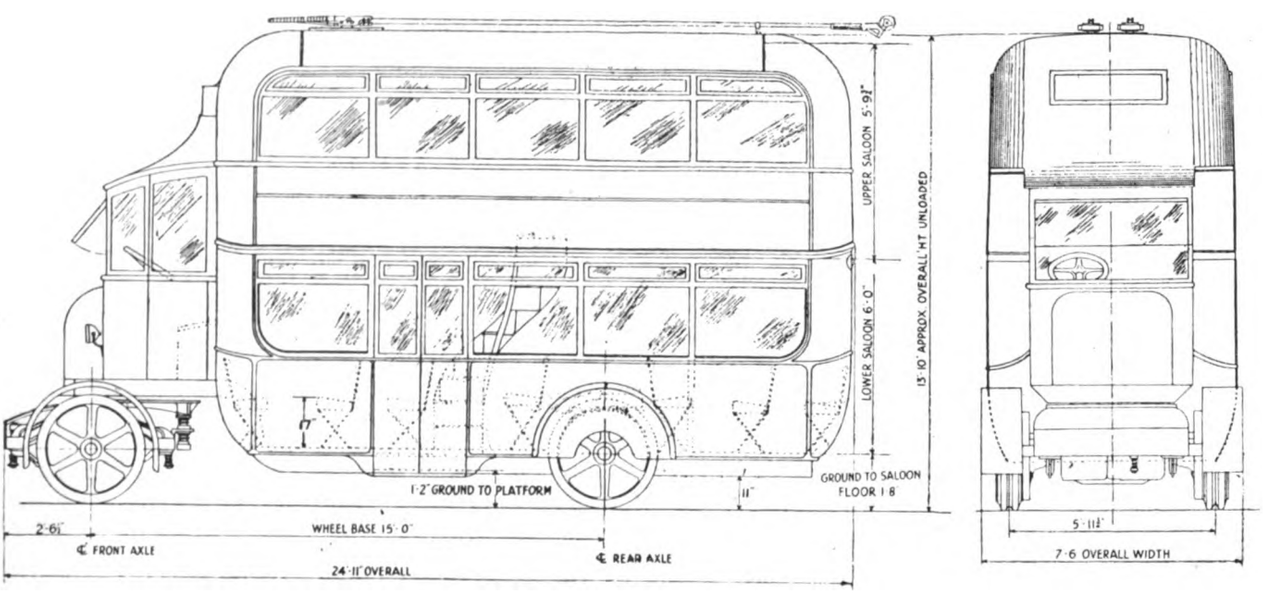
DOUBLE-DECK VEHICLE WITH CENTRE STAIRS.

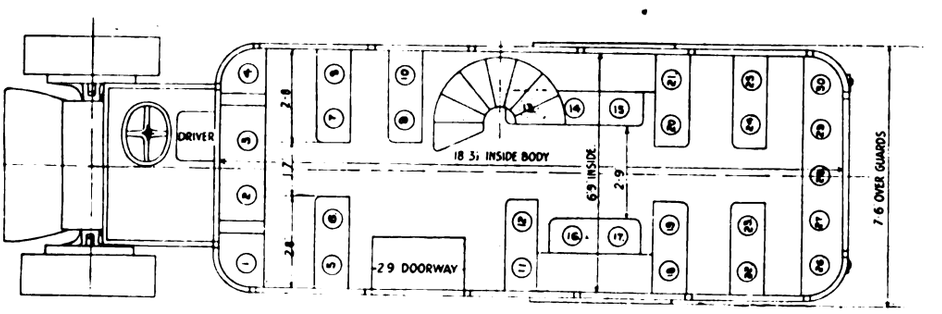
The success which has attended the use of the "front-drive" trackless trolley vehicle, with double decks, by Leeds Corporation lends interest to a new type of car on this principle that has been manufactured by Trackless Cars, Limited, of Hepworth Chambers, Briggate, Leeds. An earlier type of front-drive trackless car which had been built for the Leeds City Tramways by the same firm was illustrated and described in our issue of December 15, 1921, but while that vehicle had seating accommodation for 59 passengers, the latest one accommodates 64, in addition to the driver. It is also characterised by a number of substantial improvements as compared with its forerunner.

One of the principal advantages of the front-drive system is that owing to the concentration of the tractive mechanism at the forward end of the chassis a drop frame may be used, and this allows more head room in both saloons. The overall height of the vehicle is correspondingly reduced, and it is enabled to pass under low bridges—quite common in the north—from 14 ft. 6 in. upwards in height. The lowness of the centre of gravity also tends to reduce oscillation of the vehicle when in motion—a circumstance which naturally inspires confidence in the travelling public.



Double-deck Trackless Car with Centre Door and Staircase.





Elevations and Plan of Lower Saloon of Trackless Car with Centre Door and Stairs.

The new vehicle, as shown in the accompanying illustrations, has seats in the lower saloon for 30 passengers, while the upper deck holds 34. The headroom in the lower saloon is 6 ft. and in the upper 5 ft. 9¾ in. The overall height from ground to the roof is 13 ft. 10 in. An entirely new feature is the easy-rising staircase which is installed in the middle of the body. It passes from the off-side of the lower saloon to the deck above, and is thus totally enclosed. The entrance to the car is at the forward end of the saloon, through a doorway 2 ft. 9 in. wide. The height of the doorway platform from the ground is only 14 in.

Every provision for the comfort of passengers has been made in both saloons. All the seats have spring cushions, and the back rests are padded. Ample knee room is provided, and the ventilation is effected on thoroughly up-to-date lines so as to eliminate draughts.

The driving unit is on a fore-carriage, and the motors are carried fore and aft of the front axle, being supported at their outer ends by coil springs bearing on the fore-carriage frame. Each of the front road

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wheels is driven by one of the motors, the drive being direct through a pinion on the motor shaft and internal gear ring fixed in the wheels. The gears run constantly in oil. As mentioned in the previous article alluded to above, an important feature of the front-drive system is the ability to remove and replace the driving unit by merely undoing eight bolts attaching it to the main frame channel members and sliding out endways.

The principal dimensions of the double-deck vehicle are as follows—

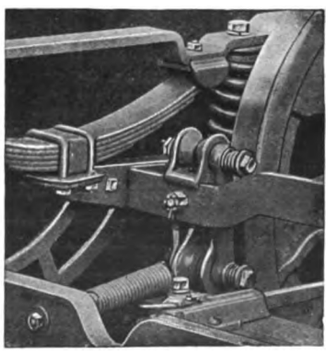
Length overall	24 ft. 11 in.
Wheel base	15 ft.
Height overall, (unloaded)	13 ft. 10 in.
Height, lower saloon	6 ft.
Height, upper saloon	5 ft. 9¾ in.
Width overall	7 ft. 6 in.
Width between wheel tyre centres ...	5 ft. 11¾ in.
Ground to saloon floor	1 ft. 8 in.
Clearance from ground	11 in.
Inside length of body	18 ft. 3¼ in.

The time taken in withdrawing and replacing the unit is about two hours. Irreversible steering is provided, so that no obstacle in the path of the front wheels can deflect the line of motion of the vehicle.

Trackless Cars, Limited, have also turned out a single-deck front-drive railless trolley vehicle. This is very similar in dimensions (except, of course, in height) to the double-deck car, the seating capacity of the saloon being 32. The seats are arranged on the same principle, and the two extra ones take the place of the absent stairway. The overall height is 9 ft. 5 in., and the height of the saloon 7 ft. 6½ in. The doorway is similarly located to that in the double-deck vehicle. These railless cars have been manufactured under the Bishop and Chadwick patents, and for the foregoing particulars we are indebted to Mr. J. Wright, general manager of Trackless Cars, Limited.

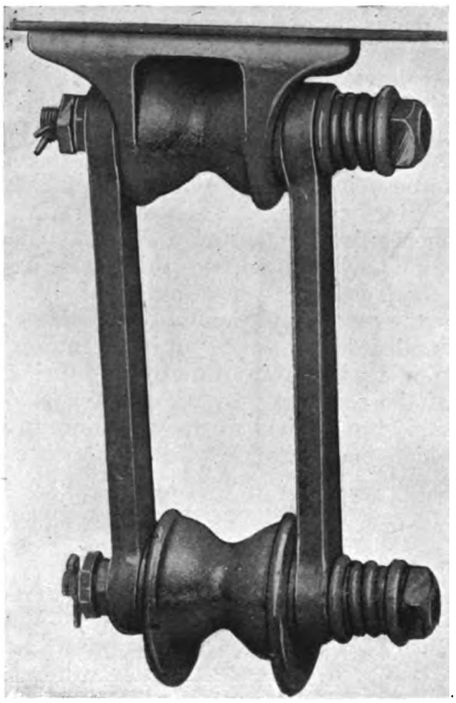
BRILL IMPROVED BRAKE HANGERS.

Half-ball brake hangers have been a standard fitment on Brill trucks for many years, and their success is undeniably due to the sound engineering principles upon which they are founded. Briefly, a pair of hanger forgings with half-ball ends fit snugly into half-ball sockets, and the whole is held in tension by a spring on a bolt, as shown in the accompanying illustrations. The upper and lower castings have hitherto been made of malleable iron. The improvement consists in making these of electric steel. Not only is this superior to malleable iron for this purpose, but the steel is further hardened by a dipping process. This produces a tough and durable surface in the half-ball sockets that offers considerable resistance to wear in this overworked portion of the truck equipment. The tensile strength of this electric steel is 70,000 lb. per square inch, compared with 40,000 per square inch for the malleable iron brackets and holders.



Brake Hanger in Position on 21E Truck.

Another feature of interest is that these electric steel castings can be produced in a few days. Three to four weeks is a good average for malleable iron. The physical elements in this electric steel are equally as marked, and, compared with the original malleable iron castings, indicate a superiority that in terms of durability and long life more than justify its selection. One of the many attributes of the half-ball hanger is its noiselessness in operation. It cannot chatter, as will be evident from the general design. Noisy trucks are a bane. Loose, ill-fitting links and pins of the common type on indifferent tracks create a large proportion of the din. The half-ball hanger has no nuts



Brill Improved Brake Hanger.

to require constant adjustment, as the spring on the bolt takes up automatically any gradual wear. This means that the ball and socket is always in contact under spring tension; therefore wet dust or grit cannot work in between the bearing faces.

The half-ball ends of the hanger forgings are milled, and the electric steel sockets are reamed, providing a perfect fit. The load and all the movement is upon these two finished surfaces, for the bolt which passes through the socket casting and the hanger ends, and on which the compression spring is placed, serves entirely as a compression member for the spring, and carries no other load and is never in shear. In fact, the hole in the socket casting through which the bolt passes is one-eighth inch larger than the diameter of the bolt. It is this feature which allows a slight torsional movement, and this makes the device self-adjustable for brakeshoe and wheel wear, as well as for any lateral motion of the wheels on curves. Vibration and jolting cannot disturb the relation of the members; moreover they cannot work or shake loose; the result is a noiseless glide to and fro. This hanger has a record of over four years' service without changes or renewals.

Cost of London Omnibus Operation.—An announcement has been made by the London General Omnibus Company to the effect that for every £100 taken in fares the company spend £90 in maintaining and working the services. "Only for a large fleet," the statement adds, "can such a narrow margin between earnings and expenses be safe and acceptable."

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THE INSTITUTE OF TRANSPORT CONGRESS.

SUCCESSFUL GATHERING IN LONDON, MAY 17TH—20TH.

The second annual congress of the Institute of Transport which was held in London from Wednesday, May 17, to Saturday, May 20, proved from every point of view a notable success. The event was naturally on a much larger scale than that of the first congress held at Manchester in January of last year, and it would have been difficult to conceive a more varied and interesting programme than that prepared for the delegates. Not only did members come from all parts of the British Isles, but there were several visitors from places abroad, including France, Holland, Vienna, South Africa and Shanghai. All were highly pleased with their reception and with the facilities which the congress afforded for inspecting centres of interest to transport men. The progress which the Institute is making as a body may be gauged from the rapid increase in membership during the three years of its life to something like 1,200. The credit for this encouraging development is largely due to the untiring efforts of the Institute's honorary secretary, Mr. H. E. Blain, C.B.E., who was chiefly responsible for the successful organisation of the congress.

The proceedings were inaugurated on Tuesday evening, May 16, by a reception at the Hotel Metropole, the headquarters of the congress, at which the president (Sir Henry P. Maybury, K.C.M.G., C.B.) welcomed the delegates and their ladies. The business meetings commenced the following morning at the Institution of Civil Engineers, Westminster, when the President of the Board of Trade (Mr. Stanley Baldwin) formally declared the congress open.

Sir HENRY MAYBURY said it was appropriate that the first congress of the Institute to be held in London should be opened by such a distinguished member of H.M. Government as the President of the Board of Trade.

Mr. BALDWIN pointed out that for a country like ours, cheap transport was a vital necessity, not only for the conveyance of foodstuffs, but for that of raw materials which were essential to preserve our export trade. Cheap transport was also essential for us to get these exports into the markets of the world, as a matter of a shilling or two in the cost of transport to remote countries might make all the difference between securing trade and losing it. There was no greater difficulty that we had to contend with at home to-day than the high cost of inland transport, and anything which could be done to remedy this should receive encouragement. It was only by the development of transport on broad and radical lines that we could enable our congested working population to live in decent surroundings and decent homes, yet at the same time continue to work at factories in the towns. In conclusion, Mr. Baldwin said he had much pleasure in declaring the congress open and wished the delegates every success in the work which lay before them.

On the motion of Sir H. P. MAYBURY, seconded by Sir SAM FAY, a vote of thanks was accorded the President of the Board of Trade.

Sir HENRY MAYBURY then cordially welcomed the visitors from abroad and said most of the British delegates present had the warmest recollections of the way in which they themselves were received when they had visited the great centres of the countries from which their visitors came. Alluding to the holding of the congress in London—"the turntable of the world"—this year, the president said the Council of the Institute of Transport were encouraged to come to this arrangement by the success of the congress at Manchester in 1921.

CONSTRUCTION AND MAINTENANCE OF HIGHWAYS.

Colonel C. H. BRESSEY, O.B.E., of the Roads Department, Ministry of Transport, read a paper on "The Design, Construction and Maintenance of Highways in Relation to the Development of Mechanically Propelled Vehicular Traffic." Mr. A. Dryland, county surveyor of Middlesex, presided. Colonel Bressey said a grave responsibility had been imposed upon the road engineer of to-day. In a time of unexampled change he had to give proof of unexampled adaptability. The immemorial road system which he inherited had to be transformed as rapidly and cheaply as possible to meet the demands of forms of transport bearing no resemblance to the traffic of thirty years ago. Utterly new standards of weight and speed were being established; the formulas and practice of the road engineer were undergoing a corresponding revision. Great assistance would be rendered to all engaged in the study of transport problems by the publication of more comprehensive and uniform road traffic statistics. During the upheaval of the past few years investigations of this character had necessarily been shelved in favour of more pressing duties, but it was much to be hoped that, before the year was out, it might be found possible to organise a general road traffic census throughout the United Kingdom, even if the investigation be limited to first-class roads.

In this ancient country, already thick set with tortuous thoroughfares, the road designer was usually faced with perplexing alternatives; on the one hand, to widen, improve, and straighten existing roads; on the other hand, to strike out along an entirely new line. It would usually be found that the balance of advantage inclined heavily towards the more courageous policy, particularly in the construction of bye-pass roads. It behoved all local authorities to co-operate with their neighbours in the preparation of well-thought-out road projects for embodiment in town planning schemes and for execution when time best served. Co-operation was, indeed, one of the first essentials of highway design. As regarded gradients, the practice of the road designer was converging towards that of the railway engineer, though with less rigid limitations. Extending the conception of highway design beyond the mere fences, a special reference to building line appeared indispensable, for the vast and widespread expenditure which was now being incurred in the widening of existing highways and in the creation of entirely new arterial roads and bye-passes, had been rendered necessary in no small degree by the lack of foresight on the part of our forefathers in allowing the main roads to become throttled by buildings.

Dealing with the question of road material, Colonel Bressey said it was surely as impossible to prescribe the "ideal" road material as the ideal motor car. One uniform prescription would not serve for Surrey and Sutherland. The search for the ideal was beside the question. Appropriate materials and sound methods had been discovered in plenty. In attempting to record the trend of development in road construction methods, the most conspicuous feature was the divergence between the two schools of thought, the search for complete rigidity on the one hand, and for elasticity or resiliency on the other. The rigidity, however, which was attainable by the use of a concrete foundation of sufficient depth, reinforced or not, was hardly applicable outside densely populated urban areas where a high initial cost could be faced. For the bulk of the country, inexorable financial considerations would lead the engineer to resort to methods in which reliance was placed on resiliency rather than rigidity.

THE DISCUSSION.

LORD MONTAGU OF BEAULIEU, in opening the discussion, wished that Col. Bressey had laid more stress on the very difficult financial problems which roadmakers had to face. Since 1914 the rateable value had gone up very slightly compared with the increased expenditure of local councils of all kinds. The constituents of every county council were determined to get a reduction in expenditure, and the almost universal desire was that there should be a reduction in the highway rate. This was very difficult, in view of the increased traffic, the demand for widened roads and better surfaces. The class of traffic for which we had to build our roads was the heavy traffic, which occasioned the most wear. The problem of the third class road was by far the more important problem left to us. We had not yet got over the difficulty of what we had to do for the little district councils whose roads were wholly of the third class grade (nearly three-quarters of the total road mileage of the country), and who were not willing to continue maintaining them for heavy, fast traffic. A way must be found for such small councils to use their local stone, rather than importing material. A great deal of education of the British public in road matters was required; if they could be made to understand that roads were vital to national prosperity, much would have been achieved.

Mr. J. CRACROFT HALLER (county surveyor of Nottinghamshire) regretted that so much money was spent by provincial towns on new roads, rather than on improving existing roads. What was wanted was the longest possible mileage of good roads; not wide roads just round about the towns. Referring to the desirability of the provision of national road statistics, Mr. Haller expressed a desire that comparable statistics of the cost in various counties should be included. The Notts County Council had decided to take over all first and second class roads as main roads. He himself

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would also take over third class roads and treat them as main roads, with the result that the whole cost of road maintenance would be spread over the whole county more equitably and more uniformly.

Major T. G. TULLOCH dealt with the corrugation of road surfaces, and said that while there was no hope of entirely eliminating road vibration itself, which was the cause, much could be done by making the surface more elastic and using, in conjunction, multi-wheel-drive vehicles.

Mr. REES JEFFREYS (chairman of the Roads Improvement Association) alluded to the construction, now proceeding, of arterial roads and emphasised the need for foresight by preserving land, in advance of its requirements, for road purposes, rather than allowing it first to be built upon and subsequently acquired at much expense. It was in this way that the financial problem would be solved. If the present arterial road schemes had been executed ten years ago, the cost would have been one-third or one-quarter of the present outlay. Labour would have been much cheaper and the roads could probably have been brought one mile nearer the centre of the town. If some legislation could be passed by which future road development could be foreseen and provided for, in advance of building requirements, many millions of pounds would be saved to future generations.

Lt.-Col. J. NALL, D.S.O., M.P., urged that the great national roads which are now being laid out must not be laid out in small sections—even if there were 50 miles to 100 miles in a section—without reference to the complete map of the country.

Mr. R. J. HOWLEY, a member of the Council of the Institute, said he had been impressed by the extensive widenings of certain roads, while neighbouring roads were not in an adequate state to carry the traffic. The matter was largely one of finance and it was not generally appreciated that the road work now being done was work of capital expenditure, as distinct from the mere repair of wear and tear. Roads were, in fact, being brought to a higher standard. He was, therefore, inclined to think that the cost should not be found out of rates and Government grants, but out of a loan raised for the purpose.

Others who took part in the discussion included Col. E. S. Sinnott, C.M.G. (county surveyor of Gloucestershire), Mr. J. Sutcliffe, borough engineer, Woolwich, Major E. A. Beaumont, Councillor Marlow Reed (M.C.C.), and Mr. A. S. Grunspan.

The CHAIRMAN urged that powers for securing land for new arterial roads should be granted to civic authorities. He hoped that the building line powers which were granted to Middlesex County Council last year would be extended by Parliament, not only to other county councils but to all road authorities. He also supported the plea for road reconstruction costs being found out of a loan, as the work would benefit future generations.

"SAFETY" IN RAILWAY OPERATION.

A paper on this subject was read by Col. J. W. Pringle, C.B., Chief Inspecting Officer of Railways, Ministry of Transport, on Friday, May 19. Sir Sam Fay presided. Colonel Pringle outlined the fundamental principles governing the safe conduct of traffic in respect of methods of operation, equipment, etc.; showed how accidents originate; and suggested directions in which these principles require to be either extended or reinforced, so that a higher degree of security in operation might be obtained. His remarks had reference mainly to conditions and practice on British railways. For more than thirty years the three basic requirements for safe operation had, he said, been universally recognised to be (*a*) adequate signalling combined with interlocking of points and signals; (*b*) block working upon double lines, whereby an adequate interval of space is ensured between trains, and token working on single lines; (*c*) the use of a continuous automatic brake.

Statistics showed that no such great immunity from accident connected with the movement of trains had been obtained as to warrant the conclusion that danger in the conduct of traffic was negligible. An examination of some 200 of the more serious accidents which had been fully reported upon during the past ten years had been made, and formed the basis for a number of conclusions. The first point to be noted from this analysis was that about 20 per cent. of the cases originated in failure of mechanism, equipment, etc., whilst 80 per cent. were directly due to failure of the human agent. It would appear therefore that there was greater need for additional safeguards against human than against mechanical failure. Colonel Pringle then gave an analysis of the cause of these accidents under various heads, and suggested possible remedies. In conclusion, he said that notwithstanding the criticisms of existing arrangements and the suggestions that had been made for improving "safety" conditions, it was readily acknowledged that a high degree of immunity from accident had already been obtained upon railways in this country. For this the responsible officers of British railways deserved the highest credit.

OPERATION OF HEAVY SUBURBAN PASSENGER SERVICES ON A STEAM RAILWAY.

This was the title of a lecture delivered on Friday, May 19, by Mr. F. V. Russell, C.B.E., Superintendent of Operation, Great Eastern Railway, at the rooms of the Royal Society of Arts, Adelphi. Mr. Arthur Watson, C.B.E., presided. Mr. Russell first explained that though the paper dealt with steam operated suburban services, he was by no means an advocate of steam as against electric operation. No one was more in favour of electricity for train working, and many other matters connected with a railway, than himself. With steam operation, especially in congested areas, there were many handicaps not experienced with electric operation. At the same time there were certain things of advantage in common use on electrically operated railways and not in common use on steam operated railways, that could be applied either directly or by equivalent means to steam operation. A steam locomotive was complete in itself, but required an enormous amount of attention and nursing to obtain the best results, attention in regard to coal, water and oil; nursing in regard to the maintenance of a good fire and a reasonable head of steam. Steam trains could frequently be made to travel considerably faster than they actually do over portions of their journey, but this would be at the expense of time taken on other portions of their journey. Such a condition of affairs could never within reason occur with electric traction, no matter whether the train was hauled by an electric locomotive or by electric motors on the carriage axles, the latter generally being arranged on the multiple unit system. The point he wanted to emphasise was that neither the motors on the carriage axles nor the electric locomotives were generators of power as was the case with steam locomotives, but were simply apparatus for converting a small portion of the power produced under most favourable conditions at some power station into a rotary motion of the driving wheels of the train. Consequently, an electric train could be forced up to the heating limit of its motors without in any way interfering with its performance on any other part of its journey.

FINANCE OF THE MODERN HIGHWAY—A PROBLEM AND A SOLUTION.

Mr. Dixon H. Davies, solicitor, Great Central Railway, read a paper on this subject on Friday, May 19. The president occupied the chair. The broad fact was, Mr. Davies said, that if the business of transport of goods by road was to be adequately provided for, and made to pay its way, it must be laid under charge for road provision and maintenance to the extent of something like 3d. per ton per mile. Apart from selected road routes to which metal plateways might be applied, the road system as a whole must be maintained at the common cost, and a proportion at least of the revenue must be collected by means of rates from the owners or occupiers of land and property who derived benefit from the transport facilities. For this purpose the present authorities should be reconstituted, and constituted, the writer submitted, *ad hoc*. They should also be given command of a capital account. It was not to be expected that local authorities charged with many other public services besides roads, having no pecuniary resources but the annual revenue from rates, and whose existence depended upon the votes of those who paid the rates, should be capable of framing a road programme based upon far-seeing policy. It must be apparent that parochial boundaries, fixed, they were told, in the days of King Alfred, were not suitable limits within which to confine the activities of those responsible for the unbounded traffic of motor transport.

On Wednesday afternoon many of the delegates accepted the invitation of the Metropolitan Railway Company to a number of places of interest in "Metroland"—the area north-west of London served by their line. A special train conveyed the party from Baker Street station to Rickmansworth and Chorley Wood, where the Cedars Housing Estate, in which the company is interested, was pointed out. Subsequently, the party were taken over the power station at Neasden, where they were shown the latest generating unit to be installed there, a 12,000 KW. turbo-alternator set. They saw also the boiler house, water-softening plant, the new switch house, one of the new type of high-power electric locomotive, and a super-heated steam locomotive. A halt was made at Wembley to enable the visitors to inspect the work upon the site of the British Empire Exhibition, 1924. The guests were entertained at luncheon at Rickmansworth, Mr. R. H. Selbie (general manager of the Metropolitan Railway Company), presiding.

Mr. H. E. BLAIN, in expressing the thanks of the Council of the Institute of Transport to the company, referred to the readiness with which they offered to entertain the delegates—a readiness which Mr. Blain described as "typical" of the Metropolitan Railway.

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Blain also complimented the hosts on a particularly artistic souvenir which they presented to their guests, and concluded by proposing the health of Mr. Selbie and prosperity to the Metropolitan Railway.

Mr. SELBIE referred to the delightful Hertfordshire countryside which the company were endeavouring to lay out, and said they were succeeding up to a point. Alluding to the Railway Act, he said the Metropolitan were neither grouped nor threatened with being grouped, and hoped to remain an individual company.

Other visits of inspection made on Wednesday were those to the London Docks, by special train on the Great Eastern; the Somers Town Goods Station of the Midland Railway; Marconi House, Strand, and the new Great West arterial road. In the evening, the Lord Mayor and Lady Mayoress of London (Sir John J. and Lady Baddeley) entertained the congress at a conversazione at the Mansion House.

One of the most interesting visits on Thursday afternoon was that made at the invitation of the Underground Company and the London General Omnibus Company to the latter's great overhaul depot at Chiswick and to the Underground Railway's power station at Lots Road, Chelsea. Special omnibuses conveyed the party from Westminster, and the delegates were conducted over the Chiswick depot by Mr. G. J. Shave (chief engineer and operating manager). The party were afterwards entertained at luncheon, Mr. H. E. Blain (assistant managing director of the Underground Company) presiding.

Mr. SIDNEY PRESTON, C.I.E., C.B.E., proposed a vote of thanks to the two companies for their hospitality, which he warmly commended Lt.-Col. Nall seconded and said that the Chiswick depot was an organisation without any real parallel throughout the world, and the General Omnibus Company might well take pride in the fact.

Mr. BLAIN, responding, said the chairman and managing director (Lord Ashfield)—who had been on the Continent—regretted his inability to be present. It was a very great and genuine pleasure to have that instalment of the congress visit their two works. Colonel Nall was probably correct when he said the Chiswick works were unique, for as far as the company knew, there was no similar plant in the world of such magnitude or with such a comprehensive basis.

At Lots Road power station, the visitors were shown over the whole splendid installation, from the boiler house, with its two floors and nearly 70 boilers, to the great turbine house, whose machines have a total capacity of 78,000 KW. They also saw the vast coal-handling and storage equipment and the ingenious circulating water screening pit.

Alternative visits on Thursday comprised those to Waterloo Station at the invitation of the L. and S.W. Railway, whose large marshalling yard at Feltham was afterwards visited (the journey being made by special train), and the aviation works of Messrs. Vickers Limited, at Weybridge.

THE ANNUAL DINNER.

A large and representative company attended the annual dinner of the Institute at the Savoy Hotel on Thursday evening, May 18. Sir Henry Maybury presided over a gathering of about 350. Among those who accepted invitations were the following—The Home Secretary (Mr. E. Shortt), the Minister of Transport (Earl Crawford), the Parliamentary Secretary to the Ministry (Mr. A. Neal), Lord Montagu of Beaulieu, Lord Gorell, Sir Sam Fay, Sir John E. Thornycroft, Capt. H. P. Riall Sankey, Sir W. M. Acworth, Sir J. Broodbank, Sir F. Gore Brown, Lady Ashfield (representing Lord Ashfield), Sir Raymond Dennis, Sir Lynden Macassey, Sir Phillip Nash, Sir H. White Smith, Lt.-Col. J. Nall, Mr. Arthur Watson, Mr. H. E. Blain, Mr. A. L. C. Fell, Mr. C. J. Spencer, Mr. G. J. Shave, Mr. Sidney Preston, Mr. R. S. Tilling, Mr. E. S. Shrapnell-Smith, and M D. A. van Heyst (Holland).

A tasteful musical programme was provided.

The HOME SECRETARY, in proposing the toast of the Institute of Transport, said he did not believe that the whole vocabulary of industry or commerce contained one word which meant so much as the word "transport." Not only did the Institute represent the great interests of every form of transport in the country, but it included in its membership some of the most eminent experts connected with each branch of the transport industry. There were railwaymen, tramwaymen and motormen who, meeting as they did for discussion within the Institute, must come to the conclusion that after all they were not really in competition and that if they would only work in combination and co-ordination, the position of everyone in the industry would be improved. Alluding to the formation of the Transport Ministry, Mr. Shortt said that whatever else the debates on the Bill might have done, they certainly brought the whole subject of transport to the front. Though the Institute was young among such bodies, it had potentialities before it greater, he believed, than those of any kindred organisation, because those potentialities were more widespread and essential to the whole industrial life of the nation. "You, I believe, will be the great heart of industry which will pump the blood through the arteries of trade. If you do that you will have done a great work, not only for the individual form of transport with which you are each connected, but for the whole commerce and industry of the great nation to which we belong." In submitting the toast, the Home Secretary coupled with it the name of Sir Henry Maybury—"one of the greatest experts on roads in this country."

The PRESIDENT remarked that he was sorry Lord Ashfield was not with them, but they had an extremely good substitute in her ladyship. He recalled how the idea of an Institute of Transport was first mooted by Lord Ashfield and pointed out that in three short years the membership had increased until it was now over 1,200. That was a very creditable rate of progress, having regard to the hard times through which they had passed. He did not think the Home Secretary put it too high when he said that the prosperity of the country depended upon efficient transport. The Institute had received great encouragement from members of H.M. Government, and he wished to thank the various right honourable gentlemen and noble lords present for according them recognition by attending that evening.

Mr. A. WATSON, C.B.E. (general manager of the London and North Western Railway) briefly proposed "The Guests," and remarked that they constituted a very representative list.

Mr. A. NEAL, replying, said the Institute was designed to make the men who controlled and served in the great transport organisations regard their industry not merely as a means of earning a living, but as an intellectual, a scientific and an elevating study, that would enable them to play their part in contributing to the prosperity of the land they all loved.

Mr. VAN HEYST tendered the thanks of the foreign delegates for the hospitality they had received in London, and remarked that the Dutch delegates had taken the opportunity to examine British methods of highway construction.

Among the tours of inspection on Friday afternoon was one to the Greenwich power station and the Charlton central repair depot of the London County Council tramways. The party made the journey from the Victoria Embankment in one of the latest types of double-deck cars (Class E.1), and were able to mark its speedy acceleration and general comfort. The general manager of the system (Mr. A. L. C. Fell) and members of his staff conducted the delegates in what proved to be a highly interesting tour of the Greenwich station, which covers an area of 3¾ acres. They first saw the frontage to the river and the pier, 200 feet in length, where coal steamers are berthed, and after examining the coal handling equipment and boilers, passed to the turbine house. Here, the last of the old four reciprocating engine-driven alternators has now been removed and will shortly be replaced by the fourth 8,000 KW. turbo-alternator. At the central repair depot, Charlton, the work of overhauling cars was observed in its various stages and attention was drawn to the extensive additions which are being made to the present buildings.

The delegates were entertained at tea and were welcomed by the chairman of the Highways Committee of the Council (Mr. C. W. Matthews). Mr. W. Murray (manager of Walthamstow Urban Council Tramways) proposed a vote of thanks to the Council for their hospitality and alluded appreciatively to the important part which the L.C.C. tramways played in the life of London.

Mr. FELL cordially returned thanks and said it had been a great delight to entertain the visitors and to show them that the tramways of London were still alive. "We are progressing, and like M. Coué, I think we are getting better and better every day." (Laughter and applause.)

On the same day another party of members was entertained by the Great Western Railway Company who first invited them to luncheon at the Paddington Hotel and afterwards took them out by train to Reading, where the company's works were inspected. An alternative visit was that to the London Terminal Aerodrome, Croydon, to which the members were conveyed by special train on the L.B. and S.C. Railway from Victoria.

Saturday, May 20, was wholly devoted to further interesting inspections. One, generally voted to be extremely enjoyable and instructive, was the visit to the Guildford works of Messrs. Dennis Brothers, Limited, commercial motor vehicle and fire engine manufacturers, of which an account is given in a subsequent page of this issue.

Other features of the congress programme on the final day included a visit to Liverpool Street Station at 8 a.m. to witness the handling of the incoming suburban traffic. (Breakfast was provided by the Great Eastern Railway Company.) An inspection of the L. and N.W. electric power station at Stonebridge Park, where the guests were subsequently entertained by the company; a visit to the Marylebone terminus to see Great Central locomotives especially equipped for burning low grade pulverised fuel and fuel oil; and a tour of the Central and London Trunk telephone exchanges. Free travelling facilities were granted the delegates to the congress on all public service vehicles—Underground trains, tramways and omnibuses.

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FINANCIAL REPORTS AND MEETINGS.

BIRKENHEAD CORPORATION TRAMWAYS made a profit of £2,247 on last year's working. This is in addition to the profit of £5,900 made on the motor omnibuses, which has been appropriated for rate relief.

BURTON-ON-TRENT CORPORATION TRAMWAYS.—There was a loss of £549 on the past year's working, compared with a deficit of £3,003 for the previous year. Including capital charges, the deficit was £4,624 against £6,459.

LA PLATA ELECTRIC TTAMWAYS.—The profit for 1921, after providing for debenture and other interest, was £2,720, making with £14,531 brought in £17,251. To reserve is placed £10,000, and the carry forward is £7,251, subject to Corporation tax, if any.

BARCELONA TRACTION, LIGHT AND POWER COMPANY are offering to holders of 5½ per cent. income bonds an opportunity to exchange for 6 per cent. (formerly 5½ per cent.) first mortgage bonds, on the basis of £1 nominal value of 6 per cent. first mortgage bonds for £5 nominal vale of income bonds.

BLACKBURN CORPORATION TRAMWAYS.—The annual report of the general manager (Mr. J. H. Cowell) shows that, after payment of interest on loans, sinking fund, etc., the net profit for the year is £1,646, compared with £751 in 1920-21. The decrease in mileage was 157,144, and in passengers 2,601,339.

NOBEL INDUSTRIES have declared a dividend on the ordinary shares on account of the year 1921 of 5 per cent., less income tax. After this distribution (which they propose to recommend as final for 1921), the estimates show there will be a balance on profit and loss account for the year to add to the amount carried forward (£757,498) as at December 31, 1920.

BLACKPOOL CORPORATION TRAMWAYS.—There was a disposable balance of £6,142 on the past year's working, as compared with £144 for the previous year. The total receipts were £261,989, and the aggregate working expenses £204,882. To the balance stated must be added £144, brought forward from the previous year, and, after deducting £50 deficiency on the omnibuses, the net balance is £6,236.

MERTHYR ELECTRIC TRACTION AND LIGHTING COMPANY.—The net revenue for 1921 was £21,074. Deducting administration and general expenses, debenture and other interest, and placing £5,000 to renewals account, there remains £5,002, plus £1,429 brought forward, making £6,431. The directors propose placing to reserve £1,200, a dividend of 6 per cent. on ordinary shares, the same as previous year, and carrying forward £1,331.

BRISBANE ELECTRIC TRAMWAYS INVESTMENT COMPANY.—The accounts for 1921 show a divisible balance of £132,487. A final dividend has been declared of 4s. per share, free of tax, making 8 per cent. for the year. The carry-forward is £46,162, subject to Corporation tax. The tramways working resulted in a net profit of £92,352, and £23,461 was brought forward. After providing £100,000 for payment of dividends, the sum of £15,813 is carried forward.

BIRMINGHAM DISTRICT POWER AND TRACTION COMPANY.—The net revenue for 1921 from tramways dividends and interest on investments was £99,830. After deducting payments to local authorities, income tax, etc., the surplus was £62,840, plus £4,508 brought in, making £67,348. After charging interest on debenture stock, providing for renewals, dividend on cumulative participating preference shares, and placing £9,430 to debenture sinking fund, the balance was £25,657. The directors recommend dividend of 6 per cent. on the ordinary shares, carrying forward £2,981.

BIRMINGHAM CORPORATION TRAMWAYS.—The accounts for the year ended March 31, 1922, show a net surplus after paying interest and sinking fund charges of £192,500. This amount is, however, absorbed by the large scheme of reconstruction undertaken during the year. The total revenue was £1,520,740, against £1,656,654, for the previous year, a reduction of £135,914, due chiefly to the trade depression. Operating expenses were reduced by £164,353 during the year, and the number of passengers carried was 183,500,000, compared with 218,000,000 in the previous twelve months.

JOHNSON AND PHILLIPS, LIMITED.—The report for 1921 shows a profit (including claim for repayment of excess profits duty), after making provision for bad and doubtful debts, and after charging to revenue upwards of £16,000 for maintenance of buildings, plant, etc., of £42,737, plus £38,727 brought in. Deducting directors' remuneration, debenture interest, etc., £18,428 for income and Corporation taxes, and £12,255 for depreciation on machinery, etc., there is to be carried forward £15,138. In view of the present state of trade caused by the engineers' lock-out and the consequently falling off of business, the directors do not recommend payment of a dividend.

MADRAS ELECTRIC TRAMWAYS (1904).—The accounts for 1921 show a gross profit of £34,661. After debiting interest and London office expenses, providing for debenture stock, sinking fund, and transferring £10,000 to depreciation and renewal account the balance is £9,744, and £5,555 was brought in, making £15,299. A dividend on the ordinary shares of 5 per cent. for the year, free of tax, is declared, and the sum carried forward is £6,436. Results for the past year were prejudicially affected by a strike which prevailed from January 10 to February 26, and by general depression which prevailed in India. During the strike a service of motor omnibuses was inaugurated and is still competing with the tramways.

TYNEMOUTH AND DISTRICT ELECTRIC TRACTION COMPANY.—The report for the year ended December 31 last shows that the total revenue amounted to £38,147 and expenditure, including the provision of £3,000 for renewals, to £34,286, leaving a balance of £3,860. This sum, added to the amount brought forward of £8,794, makes an available sum of £12,654, which the directors propose to appropriate as follows—Dividend on the 5 per cent. cumulative preference shares, £1,525; 10 per cent. on the ordinary shares, £4,641; leaving £6,488 to be carried forward. During the past year the company commenced operating a service of motor omnibuses in districts adjacent to the tramways, and the results were very satisfactory.

HUDDERSFIELD'S IMPROVED POSITION.—The chairman of Huddersfield Tramway Committee (Councillor T. Canby) informed the Town Council that the past year was begun with a deficiency of £15,086, but they now had the satisfaction of a balance of £3,105. The manager and staff were to be congratulated on the result. The money had been wisely spent, and they had obtained real and good results from the work. On the running of the omnibuses there had been a loss of £724, which was very satisfactory. There was a small loss for the first 15 months, but the omnibuses acted as feeders to the tramcars. At least 25 per cent. of the people who had been carried in the omnibuses had continued their journeys in the cars. The Council were also about to purchase seven new vehicles of a l ghter type than those now in use.

BRITISH ELECTRIC TRACTION COMPANY.—The report for the year ended March 31, 1922, states that the gross profit amounted to £262,895, compared with £264,772 in the previous year. Deducting general expenses, £44,401, there remains a net profit of £218,493 (against £220,197). Including the sum brought forward (£177,318), and after charging debenture stock interest (£84,451), and placing £14,676 to reserve, there is a balance of £296,684. This sum the directors propose should be applied as follows—Dividend of 6 per cent. on the cumulative participating preference stock, on which 3 per cent. has already been paid, and a dividend of 4½ per cent. for the year on the ordinary stock, leaving £194,237 to be carried to the next account, subject to Corporation profits tax for the years ended March 31, 1920, 1921, and 1922. The reserve now stands at £520,000.

CORK ELECTRIC TRAMWAYS AND LIGHTING COMPANY, LIMITED.—The report for the year 1921 shows that the revenue amounted to £114,772 and the expenses to £98,771, leaving a balance, including the amount brought forward, of £21,703. Deducting income tax £2,052, interest £4,851, and amount transferred for reserve for depreciation and renewals £12,000, there was a balance of £2,799 to be carried forward. In view of the heavy loss sustained by the company last year through the two months' strike of its employees, the subsequent coal strike, and the disturbed state of the country during the first half of the year, which severely affected business generally, the directors considered the results satisfactory. The capital expenditure during the year has been increased by £35,000, covering mainly the installation of a 2,000 KW. Curtis turbine and other plant at the Cork generating station.

ANGLO-ARGENTINE TRAMWAYS COMPANY.—The net revenue for 1921 was £303,647, making with £15,885 brought in £319,532. The directors recommend dividends on 5½ per cent. cumulative first preference shares for the year and on 5½ per cent. cumulative second preference shares in satisfaction of 12 months' arrears to December 31, 1917, carrying forward £6,032. At the 38th annual meeting of the Anglo-Argentine Tramways Company, held in London on May 31, Sir George A. Touche, Bt. (the chairman), said that the total receipts for the year were less by £135,000 and the total expenses more by £107,000. The position of the company was not satisfactory. The business should be self-supporting on a commercial basis. The City of Buenos Ayres was supplied with the finest tramway service in the world. Visitors were astonished at the development of tramway facilities. Yet those who supplied the service were receiving no return on a large part of their capital.

READING CORPORATION TRAMWAYS.—The annual report for the year ended March 31, 1922, of the general manager and the engineer (Mr. J. M. Calder) reveals a very satisfactory financial position, as compared with the previous year. There is a net profit on the combined tramways and omnibus undertaking of £2,988, against a deficit in the year before of £14,023. The revenue was £98,822, which compares with £99,924 last year, a decrease of £1,102. The

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tramway traffic receipts were £80,396, or 23d. per car-mile, as compared with £85,120, or 22·3d. per car-mile. The motor omnibus receipts were £17,398, or 24d. per omnibus mile, as compared with £13,916, or 21·5d. per omnibus mile, an increase of £3,482. The parcels express department shows a profit of £209, as against a loss of £309 last year. Traffic expenses show a decrease of £3,075, and general expenses a fall of £170. Repairs and maintenance cost £24,617, a reduction of £12,500; power expenses were reduced by £3,042 to £10,130. The passengers on the tramcars numbered 11,349,857, a decrease of 1,326,240. The total car mileage was 835,166, a fall of 79,213. The revenue of the omnibuses was equal to 24d. per omnibus mile, and the expenses to 21·2d. per omnibus mile. The Tramways Committee have resolved that the net profit be carried to the reserve, and have recorded their appreciation of the general manager and engineer's management of the undertaking.

Potteries Electric Traction Company.—In their report for the year ended December 31, 1921, the directors state that the traffic receipts for the first few months showed substantial increases on both the tramway and omnibus services, but that the coal miners' strike, competition of independently-owned vehicles, and general trade depression caused a serious falling off in the number of passengers carried. Working expenses continued high during the year, and the report shows that the revenue amounted to £300,831. After deducting all expenses chargeable to revenue, including £11,025 for debenture interest and the provision of £10,000 for renewals, there remains £27,840, as compared with £28,500 for 1920. Including the sum of £6,082 brought forward, there is a balance available for distribution of £33,922. This sum the directors recommend should be applied as follows—To reserve account, £5,000; dividend on preference shares at 5 per cent., £12,250; dividend on the ordinary shares at 4 per cent. per annum, £9,800, leaving a balance of £6,872 to be carried forward. The reserve fund will then stand at £114,523, and the renewals fund at £55,891. The 24th annual meeting was held in London on May 26. The chairman (Mr. R. J. Howley, C.B.E.), commented on the keen competition with the tramway and omnibus services which was being experienced from the motor coach, omnibus and other vehicles. Little or no difficulty was experienced by any owner of a vehicle in obtaining the necessary licence from the corporation to ply for hire in competition with the tramways. This form of competition without restriction was unfair and unjust.

BRITISH THOMSON-HOUSTON COMPANY.

"A Very Satisfactory Report."

In their report for the year 1921, the directors of the British Thomson-Houston Company, Limited, of Rugby, mention that the extensions to the Rugby works, which were begun in 1919, have practically all been completed. The changes in the works at Birmingham have been carried out, and the works are in operation. Owing to the expansion of the company's business, the London offices were removed to Crown House, Aldwych, W.C.2. The profits for the year, after deducting all expenses and charges other than interest on debentures and loans, were £509,258; including the amount brought forward from last year, £225,891, and deducting interest on debentures and loans, £119,446, there is an available balance of £615,703. The directors recommend that £160,000 should be appropriated for depreciation, reserves, etc., and that dividends should be paid of 7 per cent., free of tax, on the preference shares (£105,000) and 6 per cent. on the ordinary shares (£120,000), leaving £230,703 to be carried forward. During the year an issue of £1,500,000 par value 7 per cent. mortgage debenture stock was made, and the issue was largely over-subscribed. From the proceeds the company's indebtedness was substantially reduced, and since December 31 the entire amount due to the International General Electric Company, Inc., has been paid off.

The 27th annual meeting was held at Crown House, Aldwych, on May 30. Mr. H. C. Levis (the chairman and managing director) presided, and said he thought the report would be considered very satisfactory. The volume of unfilled orders on hand at the end of 1920 was such that, notwithstanding the fact that during 1921 the orders received were less in volume than for the previous year, the output for 1921—the amount billed to customers—was the greatest in the history of the company. This large output was responsible for the satisfactory results appearing in the balance sheet. Notwithstanding the general depression throughout the country, the volume of orders received by the company this year to date was over 37 per cent. in excess of the orders received for the corresponding period of 1921. The company now had on hand orders to the value of over £2,250,000. The volume of inquiries was very large, and while the proportion which had resulted in orders was not as great as in 1920, there was still a great demand for electrical machinery which must be satisfied sooner or later, and from which they confidently expected to get their fair share of business. During the year the expenditure on factories was over £450,000, principally in connection with the new Birmingham factory, the new glass works which they were erecting at Chesterfield in connection with their electric lamp business, and extensions to the Rugby plant, which would be completed during the current year.

In a brief allusion to industrial disputes, Mr. Levis expressed the hope that all outstanding differences would soon be amicably adjusted, and added that the personal relations between their own employees and management were satisfactory. The meeting terminated with a hearty vote of thanks to the chairman, directors and staff.

THE ENGLISH ELECTRIC COMPANY.

Annual Report and Meeting.

The report of the English Electric Company, Limited, for the past year shows that the net profits, including amounts transferred from reserves previously set aside and no longer required, total £317,423. The ordinary dividend is reduced from 8 per cent. to 5 per cent., less tax, and, after transferring £60,000 to reserve for contingencies, a balance of £55,599 is carried forward, against £46,236 brought in. The falling off in orders which was general in the steel and engineering trades in the earlier part of the year under review was accelerated by the prolonged coal strike, with the result that during the later months some of the company's works were not fully employed. But for this handicap the available profits would have been higher. In view of the heavy fall in the price of materials during the past year the directors have considered it advisable to write down the stocks of materials, etc., held by the English Electric Company and its subsidiaries, so as to reduce them to current market values or less, and this decision has been given effect to in the accounts under review. It is pointed out that the variations of the assets shown in the balance sheet as compared with the figures of the previous year are chiefly the result of the progress which has been made towards completing the amalgamation of the company's subsidiaries, the Dick, Kerr Works at Preston having been transferred to the English Electric Company in April last year, and the Coventry Ordnance works having been leased as from January 1, 1921.

Sir Charles Ellis, G.B.E., K.C.B., presiding at the annual meeting on May 16, referred to these changes, and said they accounted for the increase in the item, "stocks, works in progress, and debtors." In the aggregate, stocks were very much reduced during the year. As early as 1920 they foresaw that, although orders still continued to flow in, the market was, in fact, being exhausted. Consequently they reduced their stocks to the lowest possible limits. They had met the heavy fall in the market value of materials by the special writing down of stocks to a figure which represented to-day's replacement value or less. The available balance shown in the report was slightly in excess of that for last year. The results were satisfactory, but they felt bound to look ahead, and there were uncertainties on every hand. The state of things abroad was unprecedented; many foreign markets were closed; others still languished. The engineering industry had to face during 1922, owing to a serious industrial dispute, peculiar difficulties. In these conditions what might be regarded in normal times as exceptional prudence became an indispensable precaution. Full wisdom lay in the mean, and the board, in recommending a dividend on the ordinary shares of 5 per cent., considered that they had not unfairly reconciled the natural expectations of shareholders with the needs of a difficult and obscure period to come. Referring to the chaotic condition of the markets, he said that while they welcomed Government assistance, both direct and indirect, particularly as regarded finance, he was strongly of opinion that the best way out of the present difficulties would be found through the efforts of private enterprise. With the assistance of five powerful associations of world-wide reputation, they had recently formed the Power and Traction Finance Company, Limited, with the object of dealing with comprehensive engineering contracts on a large scale. In spite of general economic conditions, it remained true that the electrical industry had been less seriously affected than many others. It had the advantage among the industries of this country of youth and vigour. During the last year they had secured many important contracts. Among them were a complete central station installation for the borough of Leicester, and important railway electrification contracts in Spain and Japan. On the technical side, their business had been one of ceaseless activity. In many cases entirely new lines of machinery had been developed. The effect of specialising certain factories to particular kinds of operation had already resulted in reduced costs and better production.

Lights on Vehicles Legislation.—The Parliamentary Secretary to the Ministry of Transport has stated in the House of Commons that the Government hoped to be able before the end of the session to introduce a Bill dealing with the regulation of lights on road vehicles.

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TRAMWAY AND LIGHT RAILWAY NOTES.

ASHTON-UNDER-LYNE

TRAMWAY CHAIRMAN'S CLAIM.

Alderman R. S. Oldham, chairman of the Corporation Tramways Committee, claims that their cars carry more passengers per mile than any other tramway service in the country.

BLACK COUNTRY.

JOINT TRAMWAYS BILL.

The five Black Country tramway companies who are promoting a Bill in the present session of Parliament to synchronise the various dates of optional purchase of their respective undertakings by the municipal authorities are reported to have reached an agreement with these bodies. This will ensure that the Bill will go through as an unopposed and agreed measure. The date fixed for the exercise of the municipalities' option to purchase is, with slight exceptions, December 1938. The tramway companies concerned are—The Birmingham District Power and Traction Company; Dudley, Stourbridge and District Electric Traction Company; South Staffordshire Tramways Company; South Staffordshire Tramways (Lessee) Company; and the Wolverhampton District Electric Tramways. A clause will appear in the Bill by which the companies will be obliged, after July 1, 1923, to abandon the 2d. minimum fare, and substitute one of 1½d.

BRADFORD.

STIPENDIARY AND STATIONARY TRAMCARS.

The Bradford Stipendiary gave judgment on May 19 in a case in which a partner in a Halifax firm of motor haulage contractors was summoned for not keeping a motor wagon on the right or off side of the road when passing a certain carriage. The Stipendiary said it was contended by the prosecution that under Section 28 of the Town Police Clauses Act 1847, the defendant, in passing two tramcars which were standing almost side by side, should have kept to the off side of the road, as there was not sufficient reason for deviation to the left. Defendant contended that the tramcar was not a "carriage" within the meaning of the Act; and that, assuming the Act applied, then the fact of there being two stationary cars close together on different lines created the actual necessity or sufficient reason for deviation to the left. He (the Stipendiary) considered that in the present case there was such a condition of things as amounted to a case of actual necessity or sufficient reason for deviation, especially excepted in the Act. The summons was dismissed.

BRISTOL.

REDUCTION OF FARES.

The fares of the Bristol Tramways and Carriage Company were revised on May 8. The minimum fare was reduced from 2d. to 1½d., which had been the minimum until February last year. Workmen's fares were lowered, and special rates were granted to children.

BURTON-ON-TRENT.

STIMULATING TRAMWAY TRAFFIC.

With the object of popularising tramway travel, the *Burton Daily Mail* proposes for some weeks to offer a prize of £1 per week for the most accurate forecast of the week's tramway receipts of the Burton-on-Trent Corporation Tramways. The *Mail* hopes that the offer "will draw attention to the working man's car, and at the same time induce more people to ride and do something toward making the trams a paying proposition."

CROYDON.

FUTURE OF THE TRAMWAYS.

Addressing a special meeting of the Chamber of Commerce, Councillor A. A. Thomson (chairman of the Corporation Tramways Committee) said he held the view that with a properly reconstructed track and up-to-date equipment and service there was no reason why Croydon should not make the tramways service pay as well as the London County Council might do. He thought they had an undertaking which should be retained for the benefit of the borough and suggested that tenders should be invited for the reconstruction of the track from Norbury to Purley.

DUBLIN.

SUNDAY SERVICE IN ABEYANCE.

The service of the Dublin United Tramways Company was stopped on Sunday, May 21, owing to the failure of negotiations between the management and their employees regarding payment for time worked on Sundays beyond the specified and agreed 48-hour week. The men, who are members of the British Transport and General Workers' Union, ask that any hours worked on Sunday over and above the 48 should be paid for at the rate of time and a half per hour. The directors of the company stated that they had not even had an opportunity of investigating any cause of complaint, and feel sure that this sudden stoppage cannot be justified. An agreement has now been reached between the company and the men, whereby the latter now work seven hours on Sundays.

DUNDEE.

ACTION AGAINST CORPORATION—SEASON TICKETS.

The action of interdict brought by Dundee, Broughty Ferry and District Tramways Company against Dundee Corporation to stop the latter from running an omnibus service from the High Street, Dundee, to Castle Green, Broughty Ferry, was concluded in the Court of Session on May 20. The respondents contended that the omnibus service was being conducted purely, and as a temporary measure, for testing traffic. Complainers asserted that it was not merely a test service, and that it was causing them to lose money. Lord Blackburn reserved judgment. Season tickets are to be introduced on the Corporation Tramways. The committee cannot recommend an all-round reduction of fares at present, but cross-over fares are to be inaugurated.

EDINBURGH.

THE PRINCES STREET REPORT—CENTRE POLE DESIGN.

The report of Sir William Marwood and Colonel Pringle on which the Transport Ministry has already authorised the erection of centre poles in Princes Street has now been published. Generally speaking, the report says, the inquiry resolved itself into a question of the respective merits of centre pole construction and the conduit system. It was not denied (it is pointed out) that the conduit system was more expensive to instal and also to operate. "Although some deduction may be made from the additional cost of the conduit system as estimated by the Corporation, we think that an estimate of, say, £12,000 as a total additional annual cost under all heads might reasonably be anticipated. This would represent an increased cost, based on the present service of the cars, of rather more than 3½d. per car-mile run in Princes Street." Dealing with the question of practicability or reliability of the two systems, the report states that "there is not much to be said," and referring to the effect of centre poles on other traffic, the document asserts that in view of the width of Princes Street the traffic objections are not insuperable. As regards the question of amenity, the report says—"It is impossible to fix any monetary value for amenity . . . but, taking all circumstances into consideration, we have come to the conclusion that we cannot recommend you to refuse the permission which the Corporation ask." It is suggested, however, that the Corporation should consider the position of certain refuge platforms in the street, and the distance between the poles might be extended to 50 yards where it would facilitate the passing of traffic out of the side streets. The tramways sub-committee have rejected the design for the Princes Street centre poles provided by the Edinburgh College of Arts, on the ground that the scroll work at the top was too elaborate. A simpler design has been adopted, and 33 of these standards will be erected. The existing 39 electric standards will be removed from Princes Street, and under the new arrangement there will be fewer poles than formerly.

FALKIRK.

LICENCES OF TOWER REPAIR WAGONS.

The Falkirk and District Tramways Company were fined £10 at Falkirk on May 8 for having used a motor tower repair wagon for which a proper licence was not in force. For the prosecution it was stated that while the respondents had made an application to the County Council for a 5s. licence, this was not considered adequate, as the vehicle, not coming under the category of a tractor, was liable to £25 duty annually. The Tramway Company contended that the vehicle was a tractor within the meaning of the Act. Sheriff Robertson stated that he could not conceive any definition of tractor which would be wide enough to include the vehicle in question that would not also include every motor lorry used to carry any kind of burden. The general feature of all tractors, he thought, must be that they drew their burden behind them and did not carry it. He entertained no doubt but that the respondents failed to tender the appropriate amount of duty payable, and therefore he must convict.

GLASGOW.

OFFER TO PURCHASE THE SUBWAY.

The Corporation decided on May 25 to offer £385,000 for the Glasgow Subway, this figure including £100,000 for properties above ground. The subway has been closed for some months, and it was stated that an expenditure of about £100,000 would be necessary to convert the system from cable to electricity, and bring it up to date. The directors originally asked £500,000, and pointed out that it was only one-third of what the tunnels cost when constructed about twenty-five years ago. It was also stated that the Board are now prepared to recommend the shareholders to accept the £385,000, which would admit of them being paid 10s. for each £10 share. The Corporation's offer has since been accepted.

HULL.

TRAMWAY EXTENSION VETOED.

The Ministry of Transport have refused the application of the Corporation for a light railway order to construct an extension of the tramways to Hessle. The estimated cost of the scheme was £70,000.

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LEEDS.

EXPRESS TRAMWAY ROUTE OPENED.

The new "express" tramway route of the city tramways from Harehills to Oakwood (which was illustrated and described in our issue of March 16, 1922) was informally opened for traffic on Sunday, May 21. The track, which is laid on sleepers railed off at the side of the road, was previously inspected by Major Hall, of the Ministry of Transport. The construction of the remainder of the express route along Prince's Avenue to Roundhay is proceeding.

LIVERPOOL.

INSPECTION OF THE TRAMWAYS.

The Corporation Tramways and Electricity Committee made an inspection, on May 18, of Lambeth Road Works, where a number of tramway cars are being repaired and some new ones constructed. At luncheon at the Midland Adelphi which followed, Dr. Utting, chairman of the Finance Committee, observed that one of the best ways of enabling City Councillors to familiarise themselves with the work that was going on was to arrange for such inspections. Liverpool's tramway operations were improving. Cheap and inexpensive transit was vital to the development of the city, and he congratulated the committee upon the recovery of their undertakings from the stress and strain of the war. The chairman of the committee (Mr. Frank Wilson), who presided, gave a *résumé* of the year's working. They had spent large sums during the last three years in renewals. They had now 618 cars in service, of which 450 were twenty years old. Many of them ought to be scrapped. He thought their increased fares were justified, but later in the year they hoped to consider the question of cheaper fares. Mr. J. A. Brodie, city engineer, said that the new Prescot Road was a typical arterial road which would develop the city and its environs. The expense of its construction was being borne by the Corporation, the Lancashire County Council, and the Ministry of Transport.

LONDON.

PROGRESS OF TRAMWAYS BILL—THROUGH SERVICES.

A Select Committee of the House of Commons, presided over by Mr. Ormsby-Gore, on May 10 considered the London County Council (Tramways, Trolley Vehicles, and Improvements) Bill. When the Bill received its second reading it contained a proposal that powers should be given to construct a trolley vehicle route from West Norwood to Lee Green, but the Select Committee was informed that as the local authority—the Lewisham Borough Council—had exercised its right of veto, that part of the scheme had been dropped. The remainder of the Bill was concerned with the construction of an electric tramway of about five-eighths of a mile along Amhurst Park, connecting the London County Council tramway at Stamford Hill and that of the Metropolitan Electric Tramways Company (who opposed the Bill) in Seven Sisters Road. It was explained that the local authorities concerned desired that the tramways should be made. The only opposition came from the Metropolitan Electric Tramways Company, with whose line in Seven Sisters Road it was proposed to make a junction. The chairman said the Committee had unanimously agreed to pass the preamble of the Bill If the ground for the rejection of the Bill was to be congestion, the Committee would have expected that the Ministry of Transport and the police authorities would have had some observations to make, but no such observations had been made. It did not seem that the Metropolitan Company had made out that their property would be damaged, or in any way rendered less valuable or productive. The Committee therefore agreed to the Bill. In the House of Commons on May 22 the Bill passed the report stage, and was ordered to be read a third time. The Council began on May 2 to operate the whole of the services on the lines of the London United Tramways, Limited, between Wimbledon and the county boundary at Merton, and to run one service to the county boundary at Hammersmith and thence along the company's lines to Kew. Owing to the refusal of the Wimbledon Corporation to consent to the use of trailer cars on the Merton to Wimbledon tramways, trailer cars coming from the Victoria Embankment have to be detached at the county boundary at Merton.

MIDLANDS.

VESTIBULE FRONTS RECOMMENDED.

The Midland Area Industrial Council for the Tramway Industry has recommended all the undertakings within its district to adopt the vestibule front for all cars. It is urged in support of the request that the dust which is now thrown up from the roads by motor vehicles affects the eyes and the bronchial tubes of the drivers of the cars. The enormous increase in motor traffic has, it is maintained, rendered more protection necessary.

NEWCASTLE-ON-TYNE.

TRAMWAY EXTENSIONS.

The Corporation Transport and Electricity Committee have made good progress with their tramway extensions. The Fenham extension across the Two Ball Lonnen and on to the main Westerhope Road and the diversion to Newburn were expected to be opened this month. The new track to Slatyford was opened on June 1. The route is a continuation, 1¼ miles in length, beyond the present Wingrove Road terminus, and includes several loops and some sections of double track. An inaugural run over the new line was made by members of the Transport and Electricity Committee and of the Corporation, together with various officials. Alderman R. Mayne (chairman of the committee) drove the first car over the route, and among others present were Councillor Sir Arthur M. Sutherland, Bart., K.B.E. (vice-chairman of the committee), Mr. Ernest Hatton (general manager of the tramways), and Major W. J. Steele (city engineer). Omnibuses meet the cars at Slatyford for Westerhope and Whorlton.

PLYMOUTH.

TRAMWAY COMPANY'S LEASE EXPIRES.

Plymouth, Stonehouse and Devonport Tramways Company will cease to exist as a separate undertaking on June 30, on account of expiration of the lease, and the system will be transferred to the Plymouth Corporation. The whole of the services after that date will be run entirely with the present Corporation rolling stock, but a number of the cars purchased from the tramways company will be reconstructed and utilised as soon as practicable. The employees of the company, numbering 62, have been given the opportunity of applying for employment with the Corporation, and nearly all of them have done so. The general manager of the Plymouth, Stonehouse and Devonport Company is Mr. A. E. Maddock.

PERSONAL.

Sir Eric Geddes has been elected to the Board of the Dunlop Rubber Company.

Sir William Noble, who recently retired from the position of engineer-in-chief to the Post Office, has accepted a seat on the Board of the General Electric Company.

Mr. G. Hammond Etherton, who has been Town Clerk of Liverpool for the past 18 months, was on June 1 appointed clerk to the Lancashire County Council at a salary of £5,000 a year. His salary at Liverpool was £3,500.

Mr. Edward H. Fleming, who for the past 14 years has been associated with the Anti-Attrition Company, Limited, has resigned his position with that company and has joined Messrs. P. R. Metals, Limited, of Brentford.

Sir Sam Fay has accepted the presidency of the Institute of Transport for the twelve months commencing September next, in succession to Sir Henry Maybury, director-general, Roads Department, Ministry of Transport.

Colonel R. R. Greene, general manager of Wallasey Corporation Tramways, has reached the retiring age of members of the Corporation staff, but the Finance Committee are recommending the Council that he be asked to retain his position until December 31 next.

Mr. Thomas W. How, M.I.Mech.E., F.C.I.S., after 25 years' service as managing director and secretary of the Empire Roller Bearings Company, Limited, is shortly resigning that position in order to resume his general practice as a consulting engineer and as an expert in roller and ball bearings, at 13 Victoria Street, Westminster, S.W.1.

Mr. A. J. Abraham, tramways manager and electrical engineer of the Aberdare Urban District Council, has resigned his position in order to become electrical engineer and manager of Bexley (Kent) Urban Council Tramways. The Aberdare Council have accepted his resignation with regret, and are advertising for a manager at a basic salary of £450 per annum, plus bonus.

Mr. H. H. Lancaster, executive officer of Blackpool Corporation Tramways, who has been appointed traffic manager in succession to Mr. C. I. Baker, will receive a salary of £400 a year, with bonus, making not more than £500. Many of our readers will remember that Mr. Lancaster's father, the late Mr. James Lancaster, was for many years general manager of the Blackpool Tramways.

Mr. D. H. Duff, works manager of the motor constructional department at Brislington of the Bristol Tramways and Carriage Company, has died at the age of 38 after an operation for appendicitis. He was the son of Mr. Daniel Duff, for many years general manager of the London Road Car Company, and now a director of the London General Omnibus Company.

We regret to record the death of **Mr. John Martin,** the head of the Alternating Department of the British Thomson-Houston Company. Mr. Martin died on May 23 at his residence in Rugby. On leaving Glasgow University, where he took the degree of B.Sc., he entered the works of the British Electrical Plant Company at Alloa, and in 1903 joined the British Thomson-Houston Company at Rugby.

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CONTRACTS AND ORDERS.

Bradford Tramways Committee have decided to purchase 12 pairs of manganese steel points from Hadfield's Limited.

Blackpool Tramways Committee have accepted the tender of Tilling Stevens Motors, Limited, for the supply of a double-deck omnibus for the Thornton-Cleveleys service.

Edinburgh Town Council have accepted the tender of the British Mannesman Tube Company, Limited, for single tramway standards for erection in Princes Street at £16 15s. each.

Glasgow Tramways Committee have recommended acceptance of the tender of the Metropolitan-Vickers Electrical Company for reconstructing car magnetic brake equipments, and adding skid-proof attachments.

The Bristol Tramways and Carriage Company, Limited, have received from the Yorkshire (West Riding) Electric Tramways Company, Limited, a repeat order for ten "Bristol" single-deck omnibuses, similar to those recently supplied to that company.

The Premier Electric Welding Company, Limited, of Abbey Wood, London, S.E.2, have received an order from the London County Council tramways department for two complete "Premier" electric arc welding equipments of the self-contained motor-generator type.

Leeds Tramways Committee have accepted the following tenders—300 steel tyres, Vickers, Ltd., the Monkbridge Iron and Steel Company, Ltd., and Cammell Laird and Co. Ltd., in equal proportions. Special trackwork, Edgar Allen and Co. Ltd., the Titan Trackwork Co. Ltd., and Hadfields, Ltd.

Sheffield City Council proposed to place an order with Steel, Peech and Tozer, Rotherham, for 200 tons of steel tramway rails at £12 10s. per ton. The firm, however, approached the Tramways Committee with a view to increasing the order, and it is now proposed to give them an order for 500 tons at £11 10s. per ton.

New Trucks for Edinburgh.—The Edinburgh Corporation have been recommended by the Tramways Committee to place an order with the Brush Electrical Engineering Company, Limited, for 110 Peckham patent pendulum geared trucks at £13,310. When these have been delivered, there will be over 160 Peckham trucks of this type in service in Edinburgh.

Bournemouth Tramways Reconstruction.—The reconstruction of a portion of these tramways, now nearly completed, comprises a total of about 12 miles. The work has been carried out under the instructions of Mr. I. Bulfin, general manager of the Bournemouth Corporation Tramways, by the well-known firm of tramway and general contractors, William Griffiths and Company, Limited, of Hamilton House, London. Included in their contract was a considerable area of wood paving in the breasts of the roads, and this was carried out under the instructions of the borough engineer, Mr. F. P. Dolamore. Messrs. William Griffiths and Company also reconstructed a large section of the tramways just previous to the outbreak of the war.

PATENT LIST.

Abstracted for "The Tramway and Railway World" from the Official Journal of Patents.

*** If the inventions have been communicated the names of the communicators are given in italics.

APPLICATIONS FOR LETTERS PATENT.

The number of the patent is given in brackets.

Multiple control apparatus for electric railways (12,862)—Akt.-Ges. Brown, Boveri et Cie.
Tramcars and tramway tracks (12,411)—J. R. Cahill.
Lengthened motor car chassis and wheel base (12,125)—H. Crompton.
Electrically propelled vehicles (12,508)—J. E. Hamilton and Industrial Appliances, Limited.
Vacuum brakes for vehicles (12,657)—E. S. Luard.
Power transmission gearing for road vehicles (12,851)—E. MacHarg.
Tramrails (12,268)—J. Murphy.
Rail ties and fasteners (12,456)—A. Pokorny.
Means for operating and releasing brakes on tramcars, etc. (12,562)—A. Wheatcroft.
Rail chair or bearing plate (12,463)—H. Williams, Limited, and L. C. Williams.
Overhead electric tramway systems (13,330)—F. Ainsley and W. Platt.
Tramcars, etc. (13,087)—A. C. H. Butler and B. W. Elkington.
Electrically driven road vehicles (13,341)—F. Crawford.
Manually operated controllers for electric traction (13,080)—R. G. Cunliffe.

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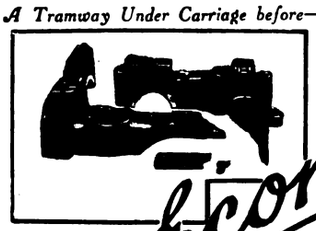
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Ventilators for passenger vehicles (13,054)—E. L. Ford.
Liquid operated brakes for motor vehicles (13,518)—G. Fornaca.
Controllers for electric traction (13,080 and 13,082)—Metropolitan-Vickers Electrical Company, Limited.
Life-guards for vehicles (13,305)—J. J. O'Farrall.
Lifting jacks (12,889)—W. L. Spence.
Braking mechanism for motor vehicles (13,301)—A. H. Wilde.
Motor vehicles (13,485)—F. Winterbottom.
Motor vehicles (13,978)—A. S. Abbott and J. Abbott.
Brakes for motor vehicles (14,159)—J. Bachelor and the Triumph Cycle Company, Limited.
Trolley poles for overhead systems of electric traction (13,779)—Brecknell, Munro and Rogers, Limited, and H. I. Rogers.
Undertrucks for tramcars, etc. (14,219)—G. N. Cadbury, Electro-Mechanical Brake Company, Limited, and E. M. Taunton.
Motor vehicles (13,900)—G. F. Fawcett and International Motors, Limited.
Liquid fuel consumption indicators for motor vehicles (13,790)—J. Higginson.
System of transference of vehicles from one set of rails to another (13,891)—R. Kelly.
Steering gears for motor vehicles (14,214)—J. A. Prestwich.
Motor vehicle steering indicator (13,841)—G. D. Quayle.
Vehicle life-guards, etc. (13,944)—P. Roberts.
Joints for steering mechanism of vehicles (14,155)—A. A. Sykes and the Triumph Cycle Company, Limited.
Engine, etc., brackets for motor vehicles (14,156)—A. A. Sykes and the Triumph Cycle Company, Limited.
Steering pillars for motor vehicles (14,157)—A. A. Sykes and the Triumph Cycle Company, Limited.
Driving axles and axle castings for motor vehicles (14,158)—A. A. Sykes and the Triumph Cycle Company, Limited.
Brake shoes of tramway vehicles (13,796)—T. C. Way.
Coach and motor car body construction (14,512)—Art Products, Limited, Forton and Bettens, and E. J. Bettens.
Electric lighting and starting installations for motor vehicles (14,820)—R. Bosch Akt.-Ges.
Tramway vehicles (14,470)—B. W. Dawkins.
Fish-plate rail joints (14,377)—T. F. Fox.
Motion transmitting system for motor vehicles (14,880)—C. A. Krogsgaard.
Power-driven vehicles (14,646)—E. C. R. Marks (*Atlantic-Akt.-Ges. für Automobilbau*).
Change-speed gearing for motor vehicles (14,375)—R. W. Maudslay and Standard Motor Company, Limited.
Change-speed gear for motor vehicles (14,861)—W. W. Moore.
Transmission gears for motor vehicles, locomotives, etc. (14,640 and 14,814)—H. C. Phillips.
Tramcar (14,497)—G. F. Slemon.
Controlling mechanism for brakes of trailers (14,519)—Soc. Anon. A. Saurer.
Splash-guard for motor vehicles (14,697)—R. Thacker.
Tramway steel line trimmer and cleaner (14,800)—W. Wye.

Specifications Published

1920

Motor road vehicles (36,632—*177,857*)—J. D. Siddeley.
Self-contained internal combustion driving unit for motor vehicles (34,580—*178,158*)—H. P. Saunderson.
Motor vehicles (36,224—*178,891*)—A. E. Alexander (*Three Point Truck Corporation*).

1921

Lifting jacks (1,697—*177,888*)—E. Faure.
Motor vehicles (6,413—*177,960*)—J. R. Kingston and W. H. Powell.
Construction of portable hand ticket racks or holders used by omnibus and tramway conductors (6,856—*177,964*)—J. R. Cross.
Device for automatically lubricating tramway axles (8,549—*177,982*)—A. J. M. Jones.
Transmission systems for mechanically propelled vehicles (10,240—*178,001*)—H. Woods and R. F. W. Manthorpe.
Gear boxes for use on motor vehicles (10,656—*178,002*)—G. Funck.
Anto-skid devices for road vehicles (452—*178,178*)—J. O. M. Taunton, E. F. O. M. Taunton, W. O. M. and B. T. Taunton.
Motor vehicle bodies (6,475—*178,269*)—Charlesworth Bodies, Limited, and C. Steane.
Steering gear for motor vehicles (18,304—*166,131*)—Columbia Carburetter Company.
Electrical trip switches for tramway and like indicating mechanism (1,514—*178,518*)—P. H. Waller.
Sockets or bases of trolley poles for electrically propelled vehicles (9,604—*178,701*)—E. M. Munro.
Levers or point boxes for operating switches on tramways (5,086—*178,990*)—O. R. Williams.
Coupling rod drive of driving axles of electrically driven vehicles (6,009—*179,008*)—E. C. R. Marks (Akt.-Ges. Brown, Boveri et Cie.
Seats for motor vehicles (6,715—*179,018*)—Charlesworth Bodies, Limited, and O. J. Critchard.
Brake levers for motor vehicles (8,857—*160,733*)—L. Feugere.
Brake release spring mechanism for tramcars (20,992—*167,502*)—J. Leah.

1922

Steering gear for self-propelled vehicles (6,589—*179,125*)—R. Venzlaff, W. von Mumm and A. von Mumm.

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TRAFFIC RETURNS.

Tramway and Omnibus Undertakings in the United Kingdom.

NAME OF COMPANY OR CORPORATION.	1921. WEEKS ENDED May 7	May 14	May 21	May 28		1922. WEEKS ENDED May 6	May 13	May 20	May 27		AGGREGATE. Wks.	1922.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Aberdeen Corporation	3,221	2,623	1,669	1,722	...	3,399	3,652	3,523	3,588	...	51⅞	179,837	− 9,447
Aberdeen Motor Buses	177	254	445	606	...	266	193	191	225	...	51⅞	11,300	+ 8,148
Ayr Corporation	619	608	534	672	...	597	542	452	772	...	2	1,223	+ 16
Barrow Corporation	899	819	1,161	921	...	586	563	548	597	...	8	4,778	− 2,484
Belfast City Tramways	13,687	12,972	13,204	13,128	...	12,251	12,607	12,124	11,122	...	8	96,608	− 7,677
Birkenhead Corporation	2,390	2,324	2,645	2,296	...	2,593	2,487	2,560	2,636	...	8⅞	21,080	+ 98
Birkenhead Motor 'Buses	609	686	975	760	...	656	681	740	769	...	8⅞	5,745	+ 327
Birmingham Corporation	30,571	29,479	30,355	25,559	...	29,020	29,275	28,784	29,615	...	8	234,871	− 14,344
Birmingham Motor 'Buses	2,081	2,087	2,902	2,410	...	1,786	1,923	1,891	2,108	...	8	14,970	− 3,306
Blackburn Corporation	1,732	1,102	1,530	1,157	...	2,262	2,560	2,399	2,535	...	8⅛	20,674	+ 2,636
Bradford Corporation	12,182	12,007	14,706	10,940	...	13,904	14,101	14,441	14,477	...	9	115,737	+ 3,575
Burnley Corporation	948	1,445	2,450	2,607	...	3,256	3,307	3,216	3,304	...	—	—	—
Burton-on-Trent Corporation ...	644	686	646	561	...	571	525	540	565	...	8	4,523	− 629
Bury Corporation	2,228	1,950	2,502	2,176	...	2,478	2,520	2,578	2,615	...	8⅞	20,788	− 15
Chatham and District	1,680	1,458	1,816	1,550	...	1,597	1,768	1,696	1,921	...	21	32,091	− 2,168
Chesterfield Corporation	1,362	1,360	1,467	1,461	...	1,218	1,269	1,218	1,204	...	7	9,412	− 1,088
Derby Corporation	1,919	1,939	2,320	1,614	...	2,047	2,149	2,119	2,229	...	8	17,412	− 355
Dundee City	3,473	3,368	...	3,526	...	3,054	2,992	...	3,074	...	1⅞	3,893	− 528
East Ham Corporation	2,145	1,965	2,453	2,028	...	2,115	2,165	2,168	2,247	...	8½	17,741	+ 452
Edinburgh Corporation	...	...	11,961	14,784	...	12,118	14,891	9,193	16,236	...	2	24,469	− 3,776
Edinburgh Motor 'Buses	...	...	3,630	8,520	...	3,553	4,398	2,691	1,586	...	2	7,287	− 1,233
Glasgow Corporation	49,956	49,351	49,844	51,093	...	44,796	45,313	44,636	46,123	...	51⅞	2,321,849	− 38,082
Glossop (Urban Elec. Supply Co.)...	269	242	246	219	...	231	221	215	229	...	21	4,781	− 235
Halifax Corporation	4,431	3,503	4,970	3,910	...	4,091	4,323	4,149	4,394	...	7⅞	32,382	− 131
Halifax Motor 'Buses	104	95	139	109	...	57	55	54	56	...	7⅞	434	− 408
Halifax Railless Cars	...	...	...	...	...	54	61	60	62	...	7⅞	446	—
Huddersfield Corporation	5,506	5,401	7,362	5,355	...	5,472	5,261	5,258	5,446	...	9	47,815	− 3,250
Ilford U.D. Council	1,541	1,567	1,832	1,573	...	1,556	1,506	1,502	1,545	...	8½	12,361	− 250
Ipswich Corporation	736	723	849	680	...	782	784	803	883	...	8	6,616	+ 112
Isle of Thanet...	706	725	1,149	910	...	767	825	789	959	...	33½	22,060	+ 609
Kilmarnock Corporation	387	426	343	371	...	351	420	260	325	...	1⅞	585	− 129
Leicester Corporation	5,629	3,013	4,058	3,189	...	7,552	7,617	7,896	7,972	...	21	153,147	+ 27,211
Liverpool Corporation	24,845	24,359	27,276	26,844	...	29,445	29,731	29,688	30,604	...	21	608,484	+ 29,958
London County Council	106,210	102,288	108,651	104,052	...	94,117	97,969	95,740	99,954	...	7⅛	729,185	− 64,166
Maidstone Corporation	470	403	500	420	...	468	458	450	473	...	7⅞	3,973	− 50
Manchester Corporation	40,370	39,410	45,167	40,967	...	37,454	37,263	35,976	36,102	...	8	300,915	− 24,765
Newcastle-on-Tyne Corporation ...	10,532	10,505	11,117	10,375	...	9,685	9,690	9,872	10,127	...	8	80,894	− 7,217
Nottingham Corporation	5,887	4,946	3,503	2,998	...	7,674	7,800	7,665	7,963	...	8	60,863	+ 15,478
Oldham Corporation	4,354	5,044	5,567	4,921	...	4,661	4,448	4,597	4,888	...	9	42,909	− 2,110
Preston Corporation	1,850	1,766	2,236	1,935	...	1,798	1,798	1,761	1,803	...	7⅛	133,881	− 1,143
Preston Motor 'Buses	...	...	...	...	...	132	124	125	125	...	7⅞	994	—
Reading Corporation	1,411	1,408	1,700	1,393	...	1,499	1,635	1,529	1,622	...	8	12,254	+ 214
Reading Motor 'Buses	334	302	498	388	...	324	340	317	351	...	8	2,642	− 39
Rotherham Corporation	2,118	1,966	2,150	2,227	...	2,117	2,117	2,065	2,119	...	7	15,026	+ 214
St. Helens Corporation	1,812	1,664	2,037	1,789	...	1,520	1,602	1,607	1,599	...	8	12,046	− 1,502
Salford Corporation	10,432	11,122	14,034	10,790	...	10,715	10,603	10,807	11,113	...	8⅞	87,128	− 6,306
Sheffield Corporation...	17,501	19,070	21,995	19,069	...	18,537	18,287	18,310	18,865	...	8⅞	151,173	− 8,380
Southampton Corporation	2,273	2,117	2,650	2,332	...	3,029	3,203	3,038	3,279	...	8	23,618	+ 2,627
Southampton Motor 'Buses	386	392	413	431	...	101	103	100	98	...	8	782	− 1,266
Southend Corporation	1,473	1,236	2,029	1,825	...	2,159	2,257	2,233	2,396	...	8	17,640	+ 4,177
South Shields Corporation	1,405	1,412	1,675	1,610	...	1,592	1,601	1,649	1,692	...	8	13,653	+ 1,195
Sunderland Corporation	2,001	2,312	2,754	2,358	...	2,399	2,393	2,474	2,602	...	8	20,356	+ 386
Swindon Corporation	419	385	482	425	...	353	399	350	379	...	7⅞	2,791	− 365
Tyneside Tramways and Tramroads	1,120	1,064	1,603	1,312	...	778	814	817	884	...	21	17,044	− 8,180
Wallasey Corporation	2,584	2,420	3,123	2,762	...	2,553	2,636	2,532	2,635	...	8½	20,966	− 1,487
Wallasey Motor 'Buses	186	273	310	291	...	229	219	240	227	...	8½	1,856	− 110
Walsall Corporation	1,610	1,661	1,956	1,552	...	1,636	1,589	1,555	1,564	...	8	13,403	− 553
Walsall Motor 'Buses	862	848	1,297	782	...	888	855	826	789	...	8	7,400	− 303
Walthamstow U.D. Council	2,189	2,211	3,044	2,337	...	1,838	1,978	2,018	2,222	...	8½	15,844	− 2,104
Warrington Corporation	1,066	1,016	898	803	...	980	963	923	962	...	8	7,802	− 111
West Ham Corporation	6,054	5,119	6,345	5,166	...	5,685	5,889	5,688	5,925	...	7⅞	45,597	− 1,159
Wolverhampton Corporation ...	2,342	2,221	3,225	2,252	...	2,024	2,136	2,025	2,125	...	8	16,992	− 1,567
Wolverhampton Motor 'Buses ...	620	600	907	665	...	611	644	613	625	...	8	5,105	+ 49

Underground Electric Railways Company of London, Limited.

NAME OF COMPANY.	1921. WEEKS ENDED May 7	May 14	May 21	May 28		1922. WEEKS ENDED May 6	May 13	May 20	May 27		AGGREGATE. Wks.	1922.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Underground Rlys. & L.G.O. Co. ...	243,047	245,503	267,349	253,827	...	234,626	239,846	240,342	250,303	...	21	4,612,025	− 306,122
London and Suburban Traction ...	55.524	54,466	64,470	56,455	...	50,437	53,775	53,947	57,628	...	21	996,203	− 101,473

Colonial and Foreign Tramway Traffic Returns.

Companies Issuing Weekly Returns.

NAME OF COMPANY.	1921. WEEKS ENDED May 7	May 14	May 21	May 28		1922. WEEKS ENDED May 6	May 13	May 20	May 27		AGGREGATE. Wks.	1922.	Increase or Decrease.
	£	£	£	£	£	£	£	£	£	£		£	£
Anglo-Argentine	80,726	81,480	82,017	83,290	...	87,566	86,875	88,632	83,995	...	21	1,768,247	+ 73,153
Calcutta ... ... Rs.	86,478	84,974	82,767	79,534	...	106,407	109,399	106,621	104,075	...	21	2,231,323	+ 738,296
Madras... ... ... Rs.	(2 weeks)	51,072	...	...	...	(2 weeks)	48,663*	...	...	...	—	—	—
Pernambuco	3,593	3,437	3,515	3,541	...	3,358	3,263	3,406	3,060	...	21½	75,268	− 15,544

Companies Issuing Monthly Statements only.

	1920. Dec.	1921. Jan.	Feb.	Mar.	April	May	1921. Dec.	1922. Jan.	Feb.	Mar.	April	May	Wks.	AGGREGATE. 1921-22.	+ or −.
	£	£	£	£	£	£	£	£	£	£	£	£		£	£
Ballarat & Bendigo	5,342	4,594	4.701	4.935	...	...	5,565	4,805	4,797	5,244	...	...	52	60,698	+ 3,525
Brazilian Trac. Mlrs	12600,000	12875.000	11941000	13102000	13562000	...	15405000	15032000	14473000	15238000	15413000	...	17	60,156,000	+8,676,000
Brisbane	...	46.280	43.205	46,300	47,750	...	...	48,790	43,800	51,300	48,700	...	17	192,590	+ 9,055
British Columbia $	917.668	908.385	838.682	867.083	835.793	...	940,113	907.242	821.828	849,680	818,177	...	43	8,589.842	+ 122,528
Buenos Ayres L'c'z	68.857	61.111	53.952	59,365	60,238	58,492	63,381	61.198	55,227	61.775	57,619	59.278	47	631,716	+ 9,272
Burma	50.481	50.035	48.405	50,931	50,159	...	54.194	59,362	52.380	60.296	58,631	...	39	522,054	+ 63,796
Cape Town ...	29.768	...	...	...	27,662	...	31,521	30.289	26.980	29,930	28,657	...	—	—	—
Carthagena & H. ...	5.560	3,877	2.839	2.226	2,329	1.602	3,237	3.075	2.773	2.145	2.991	2.793	21	13,777	+ 904
Cordoba	19.299	18.696	18.600	21.717	...	...	22.641	22.152	21,918	25.382	...	...	52	277,368	+ 39,922
East India ...	4.271	4,299	3.819	4,168	4.560	4.392	4,058	4,080	3,737	4.446	4,065	3,960	43	41,042	− 1.337
Kalgoorlie... ...	3,140	2.418	*316	2.485	...	...	2,814	2.180	2.031	2,390	...	...	13	6,601	+ 1,652
La Plata	...	6.506	*728	*3.403	...	...	...	6.724	6.318	7,067	...	...	13	20.109	+ 9,471
Manila ... $	315.599	321.449	306.389	298.317	279.534	...	316,467	309.252	310.001	284,576	286.044	...	17	1,189.893	− 15,816
Monte Video ...	...	50.863	48.119	48.925	46.189	46,579	...	32.634	48,111	51,158	47,960	48.074	30	327,493	− 5,963
Para	24.253	24.231	20,545	22.189	22,289	...	22.660	22,966	21,582	22,238	23.061	...	21	112,507	− 1,000
Port Elizabeth ...	8.185	...	...	...	7,082	...	8.344	8,120	6.690	7,851	6.892	...	—	—	—
Rangoon ... Rs.	120.000	122.588	120,718	158.121	...	...	145,500	137,850	130,583	150,500	...	...	13	418,933	+ 17.536
Winnipeg ... $	...	506,229	460,125	495,208	462,378	...	...	507,047	498,577	464,900	435,058	...	17	1,871.392	− 52,548

* Strike of Employees.

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Tramway and Omnibus Advertising Contractors

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LONDON	*Amberley House, Norfolk Street W.C.2*	**BIRMINGHAM**	*147 Corporation Street.*
EDINBURGH	*34 St. Andrew Square*	**LEEDS**	*Standard Assurance Buildings,*
LIVERPOOL	*64 South Castle Street*	**NEWCASTLE-on-TYNE**	*77 Westgate Road [City Square.*

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Leicester Corporation Tramways.
Nottingham Corporation Tramways and Omnibuses.
Portsdown & Horndean Light Railway Co.
Wakefield & District Light Railway.
Calcutta Tramways Co., Ltd.
Cawnpore Electric Tramways.
Delhi Electric Tramways.
Mandalay Electric Tramways.
Newcastle-on-Tyne Corporation Tramways.
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AEC

COMMERCIAL MOTOR VEHICLES

PASSENGER
28-57 Seating Capacity

GOODS
3, 4 & 5 Tonners

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THE sturdy, stubborn Mechanical Excellence of the A.E.C. makes it especially suitable for Reliable, Speedy, Economical Haulage. The chassis ensures the safe transport of heavy loads over bad roads.

A.E.C.'s are everywhere. Their distinct superiority has been *proven* in all parts of the world. The A.E.C. is the prime-favourite chassis with those who *know*.

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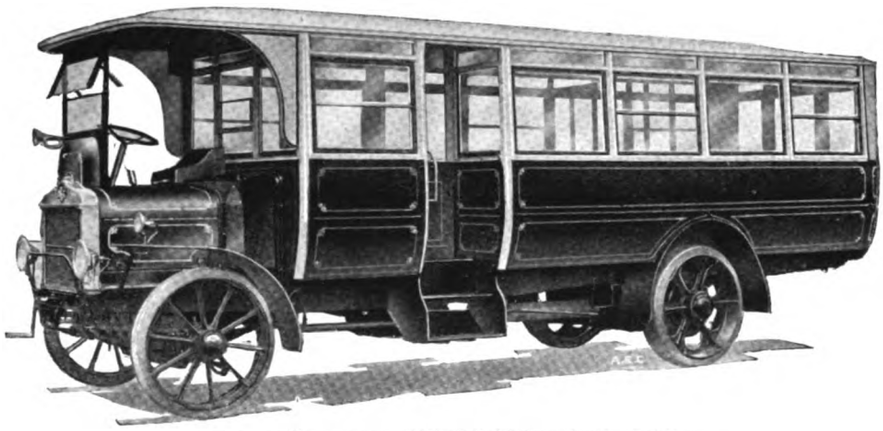
Ask us to demonstrate A.E.C. superiority



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Builders of London's 'Buses

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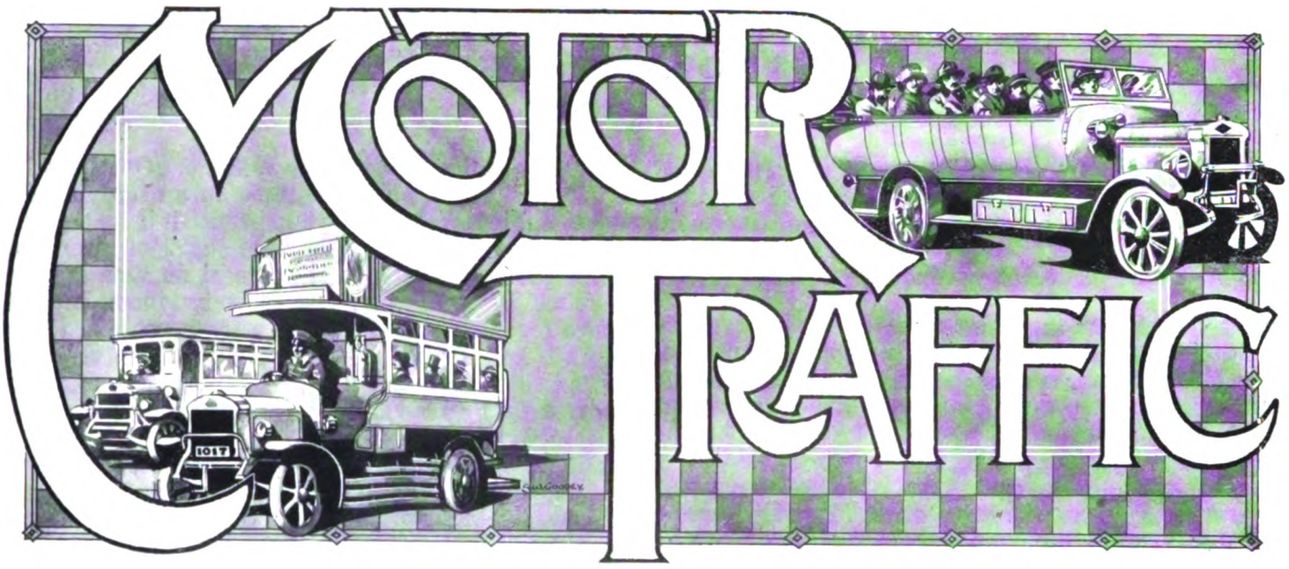

MOTOR TRAFFIC SECTION—SEVENTEENTH YEAR OF PUBLICATION.

ROAD VEHICLES OF THE FUTURE.

In the paper which he read at the recent Congress of the Institute of Transport, Sir John E. Thornycroft clearly indicated his personal belief that there will be no great changes in the nature of innovations in road vehicle design unless or until some new source of energy be discovered. He is evidently satisfied that up to the present point progress has been along the correct lines, and that the stage reached now is such that attention must for the most part be concentrated on detailed improvements. The one exception to this general view is to be found in his acknowledgment of the very great possibilities of a certain simple and well tried form of electric transmission. It would not be very surprising if in the near future we were to hear news indicating that Sir John's interest in this transmission is of a very practical character. For the rest, he is very much alive to the drawbacks of the steam as against the petrol vehicle, the awkwardness of dealing with solid fuel in any form, and the limitations of the purely electric vehicle, for which he sees little or no future. But it is probable that in his review of the position Sir John takes too little account of the possibilities of radical modification of design as the outcome of big legislative changes. He refers briefly to the possibility that, if increased loads become legal, the four-wheeled drive may grow more popular, but holds that the complication so introduced will militate against its introduction except on vehicles built to run on unmade roads or across country. This leads to the conclusion that big loads must be drawn in trailers attached to suitable tractors, but takes no account of the possible alternative of the semi-trailer type of six-wheeled vehicle, perhaps itself also drawing an independent trailer. The future of the flexible type of six-wheeler is almost entirely a matter of legal restrictions, and assuming these to be removed sufficiently and the limitation of carrying capacity to be the result of the law as to axle weights rather than as to total weights, the six-wheeler appears to have great possibilities for goods carrying work.

ENGINE POSITION.

As regards passenger vehicles, there certainly seems no likelihood of any radical change in the design of chassis, since the use of trailers of any sort is for the most part inadvisable and the weight of the load is not such as to call for the transmission of power to more than one pair of wheels. The size of the unit is not susceptible to indefinite enlargement. One of the advantages of the motor omnibus is that because its carrying capacity is limited an equally rigid limit is automatically set upon the delays occasioned by the taking up and setting down of passengers. The more commodious the vehicle the greater is the time spent in these ways, and consequently the lower is the average speed on the road. Thus, every increase in passenger capacity means a partial loss of one of the great advantages of the omnibus over the tramcar. At the same time, and despite the slight disadvantages of increasing the seating accommodation, the larger earning power which results therefrom is such as to make it obviously desirable to utilise the chassis to the fullest possible extent by placing upon it a body which can carry as many passengers as is consistent with reasonable comfort. Great strides have been made in this direction in the London omnibus during recent years, and the possibility of increasing the capacity of the unit materially without any corresponding increase in dimensions has been brought about mainly by so placing the engine as to economise the space occupied by it and the driver. Even in the very early days, the plan of placing the engine under the driver's feet instead of in front of him was tried. It was not then altogether successful, mainly because the engine itself was not sufficiently reliable, and therefore the maximum of accessibility of its parts was essential. Nowadays the omnibus engines of a well-organised company very seldom give trouble on the road, and without going so far as to place the engine under the driver's feet the alternative of putting the driver beside the engine instead of behind it may safely be adopted. This plan leaves one side of the engine quite accessible, and it is possible to arrange for all the parts that may ever need adjustment on the road to be placed on the accessible side. The comparative inaccessibility of the other side then becomes a minor matter which can be ignored if the system of supervision and maintenance is thorough. We may therefore expect to see

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MOTOR TRAFFIC

a general tendency to design engines for passenger vehicles so as to allow them to be placed in this position without disadvantage, the return being an increased passenger-carrying capacity which, in the case of a double-decked vehicle, may amount to eight persons.

WHY SOME VEHICLES ARE SHORT LIVED.

Overloading is one of the commonest causes of breakdown of commercial motor vehicles, though the effect is not always directly traceable to the cause. The evil results of overloading do not necessarily make themselves apparent immediately. For instance, in a recent example brought to the notice of the writer, an owner of a 3-ton lorry in a distant Dominion wrote triumphantly to the manufacturers stating that he had used the lorry day after day for the carriage of six ton loads, and that it had performed with absolute reliability and was apparently none the worse. He enclosed a photograph which aggravated his offence, since it showed that the type of load to which he had subjected the vehicle consisted of long balks of timber, projecting several feet forward of the radiator and half a dozen feet or more beyond the back of the tail-board. The stresses on the springs and other parts resulting from pulling such a load sharply round a corner must be terrific. No doubt the fact that the lorry survived the ordeal was good testimony to its material and stout build, but the owner will be very fortunate indeed if, in the course of time, he does not experience serious breakdowns which are really the consequence of this ill-use, even though the ill-use itself may have been discontinued. Probably when he has a bad accident while carrying only three tons, he will blame the manufacturers, forgetting that he himself is responsible as having abused the lorry in its earlier days.

OVERLOADING—OCCASIONAL OR HABITUAL.

Habitual overloading is, of course, absolutely fatal unless it is discounted by the manufacturer having assumed that it will take place. The manufacturer, of course, leaves a margin of safety as a precaution against exceptionally rough roads, slight overloading, or some unexpected shock, such as striking an obstacle, a kerb, or another vehicle. The factor of safety may be sufficient to stand a combination of unfortunate circumstances, but when the further complication of an overload is added, something has got to go. It is for this reason particularly that an occasional overload is dangerous. A single case of ill-treatment may result in a permanent injury to the metal of which some part of the machine is constructed. The fault may not be noticed, and may, in fact, be unobservable from the outside, but some time or another this fault may lead to a serious or even a fatal breakdown. One cannot cure the results of overloading by discontinuing the practice, and this is one of the reasons why the purchase of second-hand vehicles is risky.

THE SITUATION OF THE GARAGE.

To companies proposing to operate motor omnibuses or commercial vehicles in and around some large centre, the question where the garage can best be situated is a matter of importance. The most central position possible is clearly indicated as being preferable from the point of view of eliminating waste mileage. On the other hand, a site is probably cheaper in an outlying district, and this is of double importance if it is necessary in the first instance to purchase sufficient ground to leave room for considerable extensions that may be required in the future. In some instances, in fact, space for such extensions can only be obtained in a central area at an absolutely prohibitive cost. In considering the location of the garage, people are to some extent misled by the old ideas which correctly governed the similar problem as applied to horsed vehicles. It should be remembered that the elimination of waste mileage, if it can only be secured at the expense of considerable capital outlay, is less essential in the case of a fleet of motor vehicles. To the motor vehicle waste mileage covered while proceeding to the point at which useful work begins means a certain unavoidable expense, but does not reduce the useful working capacity of the machine. On the other hand, if a horse has to cover waste mileage, his useful mileage is reduced by that amount, whereas if we are operating four vehicles of about 1½-ton capacity costing perhaps a shilling a mile each to run, the necessity for covering four miles empty morning and evening means an additional cost of at the most eight shillings a day per vehicle, or 32 shillings a day in all. In actual fact the additional cost is probably less, because, for example, the amount spent on driver's wages is not increased. Thus, if the saving that can be effected in respect of garage rental, etc., amounts to something in the neighbourhood of thirty shillings a day, there is no considerable disadvantage, when accounts are balanced, in the garage located in a suburban area while, as already mentioned, the possibility of later extensions may be the determining factor in favour of such location.

REGULATION OF ROAD VEHICLES.

The Minister of Transport has appointed the following committee to consider the regulation and control of hackney vehicles in Great Britain, and the parking of road vehicles—

Sir Henry Maybury, K.C.M.G., C.B. (chairman), Director-General of Roads, Ministry of Transport.
Mr. A. G. Asher, Association of County Councils of Scotland.
Sir Thomas Berridge, K.B.E., Royal Automobile Club.
Mr. F. H. Berryman, County Councils Association.
Sir Stenson Cooke, Automobile Association and Motor Union.
Mr. F. L. D. Elliott, C.B., Police Authorities.
Sir Robert Fox, County Boroughs Association.
Mr. A. Grierson, Scottish County Burghs.
Mr. R. J. Howley, M.Inst.C.E., Provincial Char-a-banc Interests.
Mr. W. Rees Jeffreys, Society of Motor Manufacturers and Traders.
Sir Walter Nicholas, Urban District Councils Association.
Mr. F. Pick, London and Provincial Omnibus Owners' Association.
Mr. E. S. Shrapnell-Smith, C.B.E., Commercial Motor Users' Association.
Mr. C. W. Tindall, Royal Agricultural Society.
Mr. Seymour Williams, Rural District Councils Association.
A representative of the Ministry of Health.

The terms of reference are as follows—

(1) To consider existing legislation and practice in connection with the use, construction and regulation of road vehicles (other than tramcars and trolley vehicles) employed for the purpose of carrying passengers for reward and to report thereon; (2) to consider and report as to what, if any, powers it is desirable should be conferred on local, police, or other authorities to make arrangements for and/or to require road vehicles to be parked either on public highways or elsewhere in the interests of the owners or drivers of such vehicles, and with a view to the reduction of traffic congestion.

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MOTOR TRAFFIC

A NEW KARRIER MODEL.

For several years, prior to 1914, Karrier models included types designed for loads of 30 cwts. and 2 tons, and many of these vehicles are still giving useful service. On the outbreak of war, however, the whole of the company's efforts were concentrated upon the production of W.D. models for the army, and the manufacture of the smaller models ceased. Under these circumstances it is not surprising that the firm has now added a 30–40-cwt. model to the

Karrier 14-Seat Motor Coach.

excellent range of heavy-type vehicles for which they have become so well known. The new model, known as type C, is the result of careful consideration of the requirements of users of this particular class of vehicle, and has now been placed upon the market after a series of tests which have thoroughly demonstrated its capabilities to fill efficiently these requirements. In general design the new type differs considerably from the larger Karrier models, but the characteristics of sturdy construction and simplicity of layout are maintained, while it is expected fully to uphold the firm's traditions with regard to reliability and low maintenance costs.

The new model is standardised in two types, one for net loads of 30 cwts., and the other for 2 tons. In the accompanying illustrations the latter type is shown fitted with a motor coach body, with pneumatic tyres and arranged to seat 14 passengers. This is a size of vehicle which bids fair to have a very successful future, as by its handiness, comfort, and speed, it has already won much favour on its trial runs. The standard equipment of this coach, which has been built entirely at the firm's works at Huddersfield, includes the Karrier patent one-man hood, which when not in use folds away into a longitudinal box on the off-side of the body. The hood can be erected by one man in less than a minute and is folded away with equal speed and ease. The advantages of concealing the hood are many, chief amongst them being that a particularly good appearance is imparted to the lines of the body, while being enclosed in a water-tight compartment the hood is kept free from dust and wet.

The following is a brief description of the chassis—

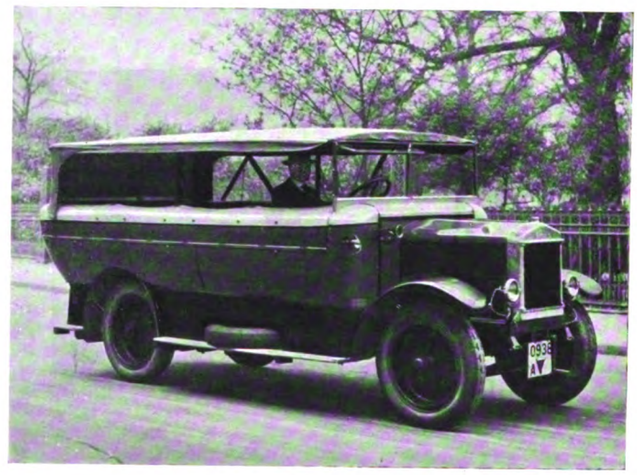
The engine is a four-cylinder monobloc type of Dorman manufacture, 95 mm. bore and 140 mm. stroke, developing 25 H.P. at 1,000 revolutions. Apart from the generous water jacketing, especially around the valve pockets where most heat is generated, there is a big margin of safety in the extra long bearings on which the crankshaft and camshaft are mounted. The most noticeable feature of the power unit is, however, the cleanness of design and the accessible position of the various units that call for periodical attention. A long inspection door, removable by undoing two handscrews, provides access to the valve mechanism, and the exhaust manifold can be withdrawn by removing two bridge pieces each held by a couple of nuts. On the offside the dynamo driven by whittle belt is placed well forward. Immediately behind it in the case of the pneumatic-tyred motor coach is a mechanical tyre pump, and behind that again is the B.T.H. magneto, the coupling of which provides a positive drive with a fine means of adjustment. The carburetter is a Zenith, easily accessible, and below it is the oil filter which can be detached for cleaning by simply unscrewing a couple of studs. Lubrication is forced by pump to all main bearings, and a simple type of tell-tale indicator is fitted on the dash, where it is within easy view and reach of the driver, so that he can always tell whether the system is operating properly.

The cooling water is circulated by pump, and a four-blade fan, driven by belt from the dynamo, is provided behind the large surfaced gilled tube radiator. The whole engine and the gear box, although separate units, are carried on a sub-frame anchored at four points and substantially supported in the middle.

The clutch is of the cone type, Ferrodo lined, with suitable means of adjustment, and the entire mechanism is exposed by lifting the front metal-covered floor boards. The gear box is a one-piece casting and affords three speeds and reverse, the forward speeds at normal engine revolutions giving a rate of $5\frac{1}{4}$, 12, and $18\frac{3}{4}$ miles an hour respectively, in the case of the commercial model, and a top speed of 20 miles an hour in the case of the passenger type. The shafts and gears are of the best quality nickel chrome steel, accurately ground to ensure easy engagement, and mounted throughout on ball bearings. Central control of the ball type with a gate device is provided, and both gear and brake levers are placed close up to the driver where they do not interfere with the front seat passengers. An easily removable filler cap is fitted on the top of the gear box. The batteries are enclosed in a wooden box placed on the driver's right, where it is protected from the weather.

Behind the gear box is the foot brake, which is of the metal to metal external contracting type, and the hand brake, which is of the internal expanding sort, operates on back-wheel drums. In both cases the adjustment is by large handscrews, the transmission brake being reached from above, and the rear brake mechanism from the side of the chassis. An open propeller shaft transmits the power to an overhead worm-driven back axle, and a couple of Hardy universal joints are used. A capacious filler is fitted at the back of the differential, and the removal of a large cover enables the whole mechanism to be withdrawn.

The road wheels are of the pressed steel disc type, with floating phosphor-bronze brushes, and by removing six bolts, the wheel and axle shaft can be withdrawn. The tyres fitted in front are 90 mm. by 720 mm., and 120 mm. by 720 mm. at the rear. The hubs are so designed that pneumatic tyres can be fitted throughout, if required. Semi-elliptic springs of good length are used, and these, in conjunction with the pneumatic tyres on the passenger model give a fine



Karrier Motor Coach with Patent Hood.

degree of comfort. The steering is of the worm and sector type. The swivel pins are fitted with large oil cups, so that when once filled they require no further attention until replenishment is necessary. The oilers are provided with screw caps held by chains.

The wheel base measures 11 ft. and the track 4 ft. 8 in. An important feature of the chassis which makes for simplicity is the use throughout of Enots greasers, with the exception of a single ordinary greaser on the clutch spigot.

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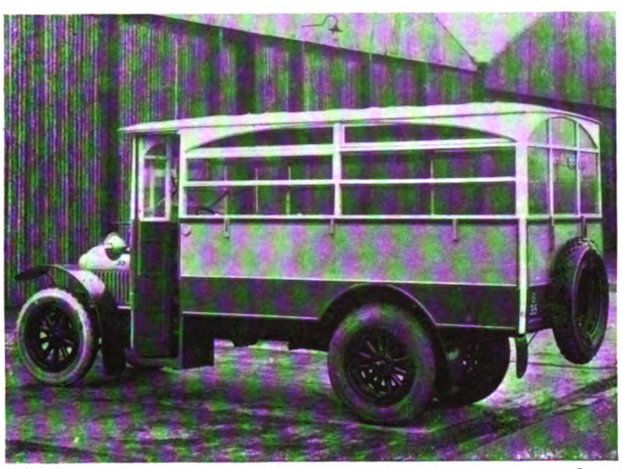
MOTOR TRAFFIC

"NORFOLK" LIGHT OMNIBUSES.

A One Man-operated Body made in East Anglia.

Judging by the experience of the United Automobile Services, Limited, of Lowestoft, there is a great future for the small omnibus running on either pneumatic or solid tyres. This type has proved popular in the Norfolk and Suffolk services. The public appreciate it because of comfortable riding, not only on account of the pneumatic tyres used with a light vehicle, but because the special construction of the body eliminates dust from the interior. By the operating company its use is advocated for several reasons. First, there is the higher speed and more frequent services. In the second place there is the economy of operation due to one man acting as driver and conductor, to the saving of fuel both with pneumatic and solid tyres, to the decreased cost of the annual licence, and to the absence of accidents to passengers.



"Norfolk" Body for Light Chassis.

The "Norfolk" body is made in four sizes, giving accommodation to 14, 26, 30 and 34 passengers respectively. The illustration given above depicts a 14-seat body mounted on a one-ton chassis, but any other suitable chassis can be utilised. In the United States the light omnibus on pneumatic tyres predominates, and consideration of the experience of the United Automobile Services, Limited, indicates that there is a wide field for its extended use in this country. The company claim that the 26-seat body (with 8 overload if necessary) is quite sufficient capacity for all except densely populated town routes. Based on a double shift of conductors, with weekly wage of £3 10s., the "Norfolk" body operated by one man is claimed to effect an annual saving in wages of £364. The saving in petrol with pneumatic tyres is given as £133 over the standard heavy vehicle, and with solid tyres £83. The basis of calculation is 6 miles per gallon for the heavy omnibus, 10 miles per gallon for the lighter vehicle on pneumatic tyres, with spirit at 1s. 11d. per gallon, and an annual mileage of 20,000. In taxation there is a saving of £22 for the 26-seat machine. A further contention is that a pneumatic tyred omnibus is approximately 50 per cent. faster than one with solid tyres, thus enabling the earnings to be increased, and rendering it possible for two such vehicles to replace three of the heavier cars, while if the same number of "Norfolk" omnibuses are used, a more frequent service can be maintained. On repairs it is estimated that the latter effect a saving of 1½d. per mile, running at a speed of about 16 miles an hour, compared with about 11 miles per hour of the heavier units.

A glance at the illustration will show the advantage of what is justly termed the safety door. To the entrance and exit by the side of the driver there is a door that closes over the outer step, which is close to the ground. The driver shuts the door before starting, and does not open it until the omnibus has stopped. By this procedure he prevents the most frequent cause of accidents, due to persons boarding or leaving a vehicle in motion.

The prices of the four sizes of body range from £200 to £400. The bodies are built in the company's coach building factory at Lowestoft under the most approved conditions of quantity production.

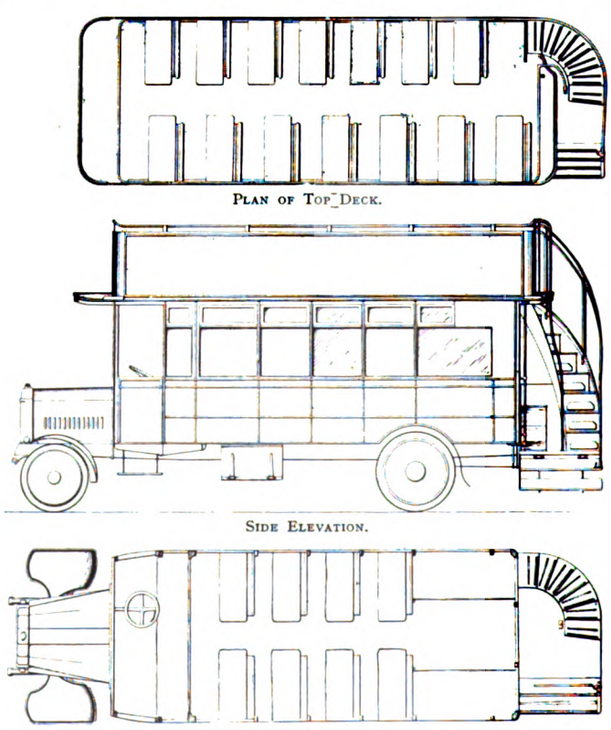
THE DODSON DOUBLE-DECK BODY.

Commodious Seats, Wider Gangway, and Better Ventilation.

With praiseworthy results, Messrs. Christopher Dodson, Limited, of Willesden, N.W.10, recently set themselves to remedy shortcomings in the interior width of double-deck omnibus bodies which have to comply with the outside dimensions permitted in the Metropolitan area. The first batch of the improved bodies has been delivered, mounted on Dennis coach type chassis, to the Westcliff-on Sea Motor Services, and opinion in that locality appears to be that the new superstructure constitutes a great advance in omnibus construction. From the accompanying photographs a clear impression will be gained of the interior and exterior of this body. Details of the dimensions will be gathered from the drawing showing the general arrangement.

As builders of bodies to a number of leading manufacturers of public passenger vehicles, Messrs. Dodson have, of course, carried out various designs supplied by their customers. Consequently the firm is well aware of the deficiencies revealed in some cases when the machines have been put into service. In seeking to provide a remedy, Messrs. Dodson have, therefore, benefited not only the public but the operating companies.

The specific intention underlying the CD22 design, as already mentioned, is to obtain greater width inside without exceeding the present permissible width in the London police area of 7 ft. 2 in. It is common knowledge that the interior cross seats of the London omnibuses could, with great advantage, be increased in length, a freer gangway being also very desirable. The builders seem to have made a distinct advance in this direction. They dispose each of the side pillars of the body framework immediately behind the interior chair backs. The importance of this will be recognised when it is pointed out that in this position the pillars can be of any required cross-section without interfering or encroaching upon the interior room. Another innovation is that the panels are not flush with the pillars, but are placed immediately on to the waist rail in between the pillars. The result is seen in the provision of an increased interior width of 3 in., over and above that in the usual conventional construction. This improvement enables the length of each of the cross seats to be increased by 1½ in., and considerably more freedom is noticeable in the gangway when all seats are occupied. This special feature of the body, the builders inform us, they have protected.



Plan of Top Deck.

Side Elevation.

Plan of Lower Deck.

Dodson Double-Deck Body.

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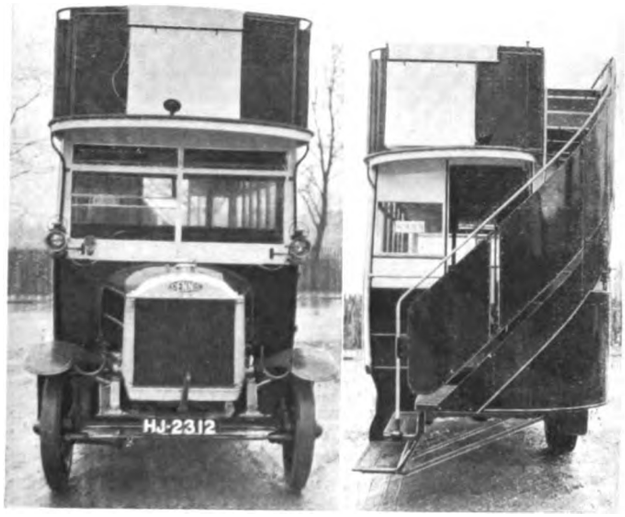
MOTOR TRAFFIC

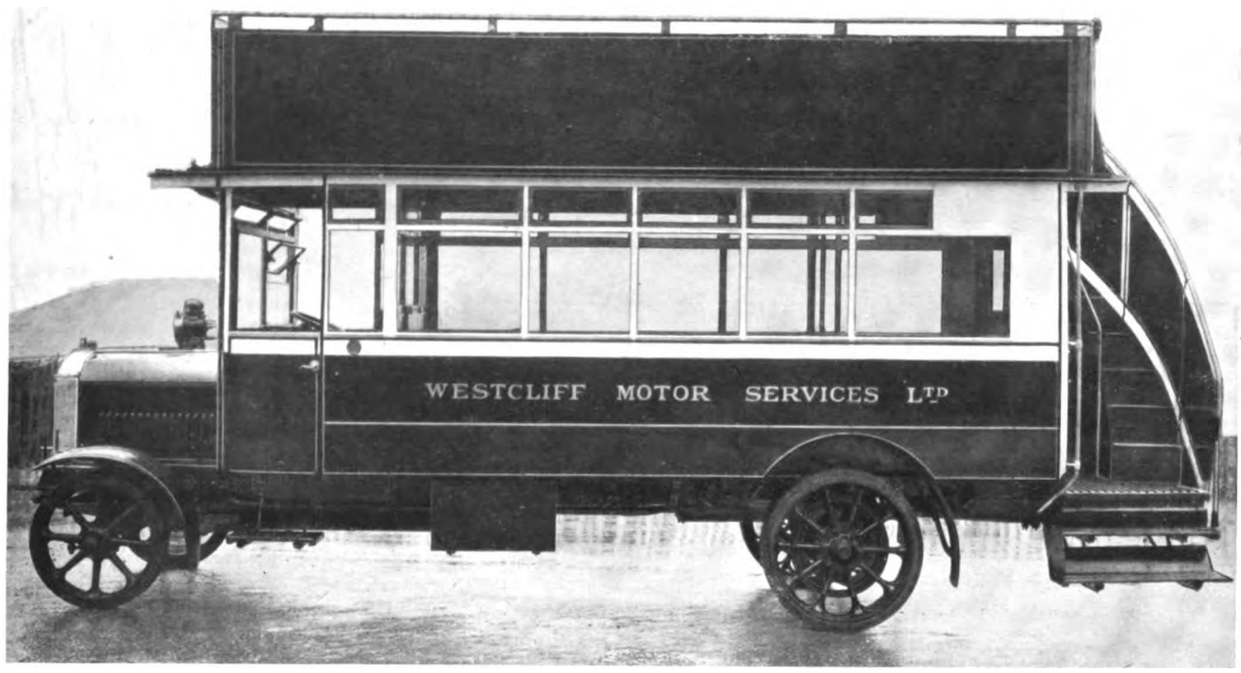
Another interesting feature of the omnibus is the ventilating arrangements. Each of the ventilators above the side windows open at the fore-end. This arrangement is not new, as several omnibus and tramway undertakings at present have incorporated this feature, but owing to the eaves of the roof overhanging only by



Front and End Views of Dodson Double-Deck Body.

about 1½ in., with this type of ventilator, rain would enter the body unless special provision was made to prevent it. Messrs. Dodson bring the side screen boards right down on to the roof, leaving no gap whatever. On the roof and up the boards they fit a light metal gutter. Down-pipes are provided at the fore-end, and one at the near rear corner, the latter also functioning as a grab handle.

Another feature is the elimination of top roof irons, which are usually fitted to carry the screen boards and top rails. The supports for the top rails are integral with the screen board framing. The supports are of hard wood, grooved out on the top to carry the rail which is fixed to them by a light metal clip. The omnibuses now running at Westcliff may be claimed as a great advance in body construction.



The Dodson Double-Deck Omnibus Body.

BIRMINGHAM AND MIDLAND OMNIBUSES.

SUCCESSFUL YEAR, BUT RAILWAY COMPETITION REVIVING.

Mr. R. J. Howley, C.B.E., chairman and managing director, at the 17th annual meeting of the Birmingham and Midland Omnibus Company, Limited, on May 24, stated that the net receipts amounted to £103,095, compared with £81,892 for 1920. The increase had been brought about by the larger volume of passenger receipts, due largely to the extension of the services. The increased traffic revenue, he was glad to say, had been earned with a smaller percentage of expenditure to receipts than was the case in the previous year. The price of petrol, of which they used large quantities, fell during the year, and it was possible to effect some reduction in the rate of wages paid. Income-tax had decreased from £7,445 to £2,340 owing to the larger amount recovered on the payment of increased dividends. The balance sheet showed a strong position in regard to cash and investments. A sum of £25,000 had been placed to reserve, bringing the total of that account to £75,000. The amount available for distribution was £90,343, as compared with £59,812. They were paying 10 per cent. on the ordinary shares, with a bonus of 5 per cent., and carrying forward £22,170. During the first part of 1921 the traffic receipts showed continued expansion, but during the summer and autumn a great change took place, and private hire work especially showed a considerable falling off. The reduced spending power of the public, and the competition of cheap week-end and market tickets on the railways were becoming apparent in the passenger receipts. The decrease in receipts was being met to a very large extent by reduced cost of operation, and the prospects of the company for the current year were, so far, not unsatisfactory. In view of the uncertainty of the future the directors considered it better not to increase the dividend on the ordinary shares, but to distribute a bonus in respect of the results of the past year. Capital expenditure had been kept down to as great an extent as possible. The long-distance services were well patronised. They had in Mr. Power, the traffic manager, and Mr. Shire, the engineer, two officers to whom was due more than to anyone else the continued prosperity of the company.

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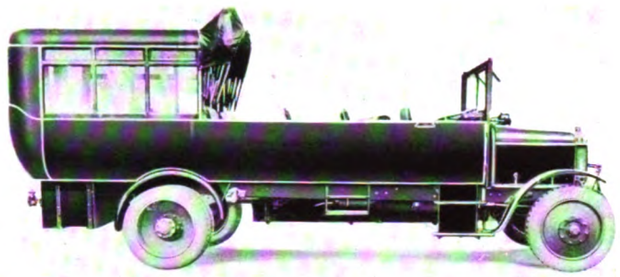
MOTOR TRAFFIC

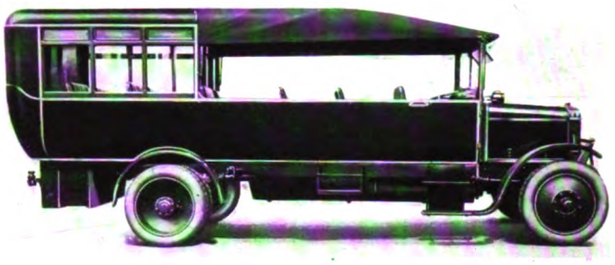
NEW TYPE ALL-WEATHER COACH.

NOVEL DESIGN BY COMMERCIAL CARS LIMITED.

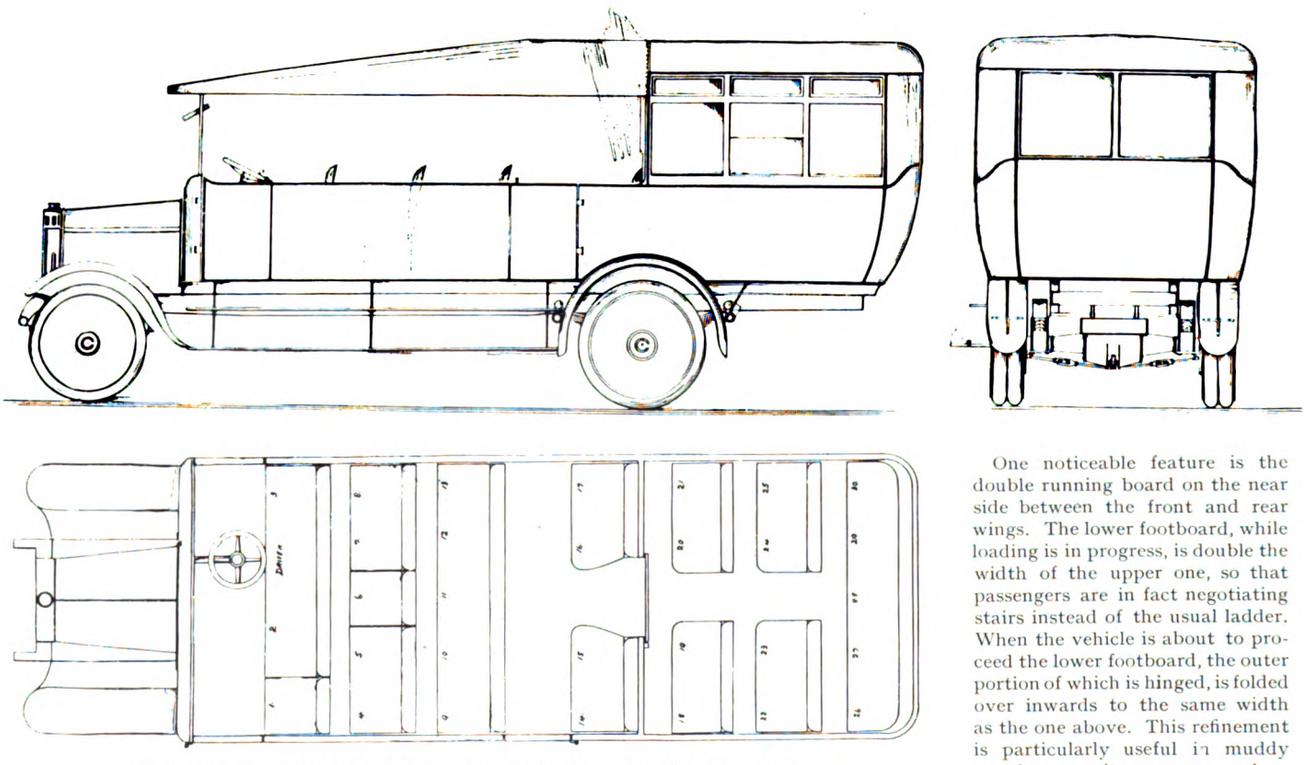
A new type of "all-weather" coach, possessing several interesting features, has been built by Commercial Cars, Limited, of Luton. The vehicle is divided into two portions, as will be seen from the accompanying illustrations. That in the rear is permanently covered in, and accommodates 13 passengers. It is fitted with frameless windows of ¼-in. plate-glass both along the sides and in front. All the windows drop down level with the fence rail, making the interior quite open when necessary. Three ventilators are arranged along each side, above the drop windows. The open portion of the body accommodates 16 passengers. There are two doors on the off side—one at the front giving access to the first three rows of seats and the other by the fourth row, admitting to the covered-in portion. A door for the driver is located on the near side. With all the windows down the vehicle is, to all intents and purposes, an open one.



All-Weather Coach with Hood.



All-Weather Coach with Hood Extended.



Plan and Elevation of All-Weather Coach—Commercial Cars, Ltd.

The seats are arranged in pairs, each having arm rests, to take two persons. There is a gangway down the centre, and the back seat, which is of the full body width, takes five persons. The whole of the seats are upholstered in best black leather. They have very comfortable spring cases, and the backs have pleated squabs. Gangway seats with special folding backs are fitted to the driver's seat and the second seat. The floor of the saloon is raised 2 in. above the floor of the front portion, and the height of the saloon from floor to roof is 5 ft. 8½ in. Electric lights are fitted in the roof.

Passengers in the open portion are protected from bad weather by a patent cantilever folding hood of black waterproof twill, which when not in use folds back to the permanent portion, and in no way obscures the view. Another feature of this hood is the absence of hood sticks requiring attachment to the sides of the coach when the hood is open. By drawing this hood across, putting up the side curtains (which have celluloid lights), and closing the windows, the vehicle can be totally enclosed with very little trouble. The chassis is the "Commer" 3P passenger type, with interchangeable disc wheels and twin pneumatic tyres on the rear and singles on the front. The wind-screen extends the full width of the body, and the portion opposite the driver is made to open.

One noticeable feature is the double running board on the near side between the front and rear wings. The lower footboard, while loading is in progress, is double the width of the upper one, so that passengers are in fact negotiating stairs instead of the usual ladder. When the vehicle is about to proceed the lower footboard, the outer portion of which is hinged, is folded over inwards to the same width as the one above. This refinement is particularly useful in muddy weather, as it ensures a clean landing step. The bottom framing is of well-seasoned English oak, and the pillars are of English ash. Steel plates form the outside panels, while the inside is panelled in three-ply birch. The body is painted royal blue, both inside and outside, with mouldings lined yellow. The ceiling of the saloon is enamelled. A large box is fixed at the rear for carrying suitcases, and a petrol carrier, to hold three tins, is installed on the off side. Dome wings are fitted back and front.

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MOTOR TRAFFIC

FUTURE DESIGN OF ROAD VEHICLES
FOR GOODS AND PASSENGERS.

Sir John E. Thornycroft, K.B.E., presented a paper on this subject at the London Congress of the Institute of Transport on May 18. Referring to the present method of taxation he said—"Its effect, as regards the pleasure motor car, is already apparent and most unfortunate. Taxation on the cylinder diameter has resulted in producing cars with motors having cylinders of very small dimensions and running at very high speeds which, while they may have limited vogue in this country, will have little, if any, sale in overseas markets where vehicles with larger, slower running engines are much preferred. The large commercial vehicles are now taxed by the weight and there is really no reason why cars should not be taxed in the same way also. There is nothing impossible about it, as it is the practice in a number of the colonies."

After alluding to steam, petrol and electric battery vehicles, Sir John said—"There is a fourth type which it seems hardly fair to look upon as a self-propelled vehicle in the ordinary sense. I refer to an electrically-driven vehicle, taking its source of power from an overhead conductor in the same way that a tramcar does. It seems improbable that a vehicle driven in this way will ever come into general use for carrying goods but, for passenger work, it is probable that there will be a very considerable development owing to the vehicles combining the advantage of obtaining their power direct from a central power station, which must necessarily be much more economical than power generated by small individual motors, and having the freedom of an independent vehicle to move anywhere in the road as long as there are electric conductors."

The author then considered in detail the efforts that are being made by designers of different types of vehicles to improve efficiency. Dealing with steam vehicles, he stated that with neither of the two well-defined types is any attempt made to condense the steam and the large quantity of water which is necessarily carried not only adds to the weight of the vehicle but is often difficult to obtain. It would be generally agreed that the designers had probably done as much as was possible with a non-condensing vehicle of this type. One of the earliest designers of steam vehicles, Mr. T. Clarkson, was, however, still working with a view to improving the type and had produced a very interesting design.

Discussing electric vehicles, Sir John remarked that electro motors are so far standardised that one can only look to improvements in storage batteries to make any great change in their carrying capacity and radius of action. Dealing with petrol vehicles, he pointed out that the design "which has been generally adopted, as the result of practical experience, is that consisting of an internal combustion engine on the front of the vehicle placed over a steering axle, a disconnecting clutch and a change speed gear of the simplest possible form, namely, a driving and driven shaft with gears of different ratios which can be slid in and out of mesh, the power being transmitted to the driving axle by a shaft operating a worm gear on the axle or by means of bevel drive. Chain gear is still employed in some cases, but it is certain that it is being displaced by gear transmission.

"In considering the chances there are of any radical change one would ask, is it probable with increasing loads that builders will adopt a drive on all four wheels? Where vehicles are intended to run on made roads, in the writer's opinion, the complication of driving on more than one pair of wheels would always be a bar to the adoption of the system. For vehicles to run on unmade roads or across country, a four-wheel drive has great advantages, but it is probable that, for these conditions it will be more economical to use an ordinary lorry drawn by a special tractor. If we assume that the vehicle will continue to be driven by one axle, what are the most likely features to be modified? Running costs are largely made up of fuel consumption and maintenance. It is a very nice point for the designer so to proportion the parts of his mechanism that he does not make the size of the various parts of the mechanism so large, to reduce the stress and wear, that he unduly increases the weight of his machine and its consumption of fuel.

"The only alternative to the gear box transmission, which is meeting with any success for commercial vehicles, seems to be the Stevens' electric drive consisting of a continuous current generator driven direct from the motor and which, in turn, drives the axle by means of an electro motor coupled to it by a propeller shaft or other means. While the inevitable shock, which is often very small, of engaging the clutch and gear in the ordinary system is avoided and a very sweet drive obtained, the efficiency of the electric transmission is necessarily less than that of gearing and a considerable additional weight is added to the vehicle. How far these are balanced by reduction in wear and tear is a matter for experience, but the designers of the system contend that there is an advantage on the side of the electric transmission."

Referring to the advantage which designers now have of using greatly improved material, the author said there is a possibility of employing aluminium to a greater extent owing to improvements in its alloys. "The extent to which its employment will increase will no doubt depend to a great extent on the price at which it will be produced in comparison with cast iron and steel. Coupled to some extent with the employment of aluminium for various parts of the lorry will be, it is thought, the use of pneumatic instead of solid rubber tyres. The relative advantages of solid *versus* pneumatic tyres are difficult to decide. For passenger vehicles and lorries taking fairly heavy loads, with the present cost of pneumatic tyres it seems very doubtful if they are worth while except in certain special cases. For the heavier loads, the pressures required in the tyres are so great that the shocks to the road do not seem to be very much less. While designers of the chassis have been doing their best to save weight, with the exception of the London General Omnibus Company and a few others, little has been done to improve the construction of the body work of passenger or goods vehicles. When goods are carried on a plain lorry platform, the weight is a small proportion of the load, but, in the case of a high-sided or box van, it becomes quite a large proportion. The weight of the containers now used by large carriers and railway companies is often a very large proportion of the load, and to obtain really economical results with this system considerable improvement must be made. There is a tendency to give less space in the front of the vehicle to the motor and there is every probability of the arrangement, in which the driver is placed alongside the motor instead of behind it, being further developed."

The writer did not think it probable that there would be any great change in the design of present-day road vehicles, and engineers would have to content themselves with devoting attention to improving details of design with a view to getting the best possible economy out of the fuel available and making the machines as simple as possible to maintain.

THE DISCUSSION.

Mr. R. J. HOWLEY, in opening the discussion, suggested that the reason why the steam vehicle continued in favour was because it was economical to run on account of the comparatively cheap form of fuel. The cost per ton-mile to-day was about one-third of that of petrol. All who were concerned in mechanical road transport should appreciate the work Mr. Clarkson had done in developing the steam vehicle. Users of petrol vehicles were depending, unfortunately, on imported fuel, and every encouragement should be given to such men as Mr. Clarkson and others who were evolving a type of vehicle which required fuel that could be produced in this country. He had no doubt that as time went on there would be developments in carburisation and pre-heating of fuel which might result in the satisfactory use of a cheaper form of fuel. Discussing the railless trolley vehicle as a possible substitute for tramways, Mr. Howley said that where the traffic on a tramway route did not justify the relaying of track, he thought the railless vehicle had a future. On long routes, however, it would generally be found that the purchase price and cost of upkeep of the overhead system—not only the wires but the feeding cables—rather detracted from the railless system, from a commercial point of view. There did not seem much prospect, for some time to come, of any big developments other than along the lines of the petrol chassis. Anyone who travelled in a large omnibus must know that the clutch was not yet satisfactory. For starting or for changing speed with a heavy load, the clutch as it existed to-day was, in his opinion, a rough and uncouth piece of mechanism. There was no doubt that even in its present form it could be greatly improved.

Mr. A. Dryland (county surveyor of Middlesex) said the vehicle which damaged the roads also damaged itself, and therefore he believed that the vehicle designer would in future pay more attention to the question of shocks, their distribution and absorption. Relief might be obtained for the roads by the reduction of unsprung weight or the complete springing of vehicles by more resilient tyres, preferably of the cushion or pneumatic type. Anything which manufacturers could do to improve their vehicles would help the road authorities very much, besides helping themselves.

Mr. NEVILLE (managing director of Messrs. Whitbread, brewers)

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MOTOR TRAFFIC

said the problem of determining the relative cost of transport with each class of road vehicle depended not so much on the economy of the vehicle itself but on the cost of loading and unloading and of standing still in traffic.

Mr. G. J. SHAVE (chief engineer and operating manager of the London General Omnibus Company) believed that there is a great future for the producer-gas system used on commercial vehicles. This method was not, however, desirable for omnibuses, as the driver should be given as little as possible to do besides driving the vehicle and watching the road. The producer-gas plant would give him a little more to do than could be allowed. He considered it would be many years before they could devise anything better adapted for passenger-carrying than the petrol driven chassis. A good deal of research work could well be directed towards affording a smoother type of transmission. As regarded the alleged inefficiency of the clutch, Mr. Shave mentioned that his company were using a multiple plate clutch. Unsprung weight was a very serious proposition and they should do everything to bring it down to a minimum. The tyre was the first item that should be tackled. The pneumatic was not yet anywhere near general adoption for the heavy vehicle, but they were very near to the adoption of a more resilient cushion tyre, with aluminium wheels, for such vehicles. Alluding to the trolley omnibus, Mr. Shave favoured its use only where the necessary electrical equipment was in being, and described as foolish and unprofitable the installation of a central station and overhead equipment for the purpose of running a service.

LORD MONTAGU OF BEAULIEU said there must be more co-operation between the roadmaker and the designer of motor vehicles. The design of the latter would eventually follow the same trend as the railway vehicle; in order to relieve the wear of the road we must put the strain on more than four wheels. Discussing future methods of motive power, Lord Montagu confessed himself a firm believer in the gas suction plant for many purposes for which petrol was used to-day. He also expressed the opinion that the present system of taxation of motor vehicles was very bad.

Mr. F. CHURCHILL (chairman of the Commercial Motor Vehicle Section of the Society of Motor Manufacturers and Traders) said from the road point of view he did not see any advantage in a six-wheeled vehicle, as the maker would put the maximum permissible load on each wheel. The basis of motor taxation was wrong, as at present ownership was taxed, however seldom the owner might use the vehicle. Taxation should be by weight in conjunction with the extent of the user.

Mr. SIDNEY E. GARCKE said that for passsenger work, as compared with goods, what was needed was better springing, easier starting and braking. For passenger work we could not make a vehicle of much greater length than the present ones without recourse to six wheels—which would surely come in the end.

Mr. A. L. C. FELL (general manager of the London County Council Tramways) said the ordinary road authority got back from taxation some of the increased cost of providing the permanent way for ordinary motor vehicles. Tramway authorities got nothing, and their interest that morning was to find out in what direction manufacturers were improving their motor vehicles so as to lighten the wear on the roads. He had heard no suggestion that the weight would be decreased. It might be that the designer of the latest passenger vehicle was reducing weight per seat, but that was in order to put on a larger load. They had been enjoined from youth to bear one another's burdens, but no one seemed disposed to bear the tramwaymen's burden. (Laughter.) In a reference to the trolley omnibus, Mr. Fell favoured a suggestion for a combination of the tramway and the railless vehicle and said that if the power station and overhead system already existed, it was quite an easy matter to arrange a connection with small outlying districts in order to test the traffic. The taxation of motor vehicles was on an entirely wrong basis and he hoped some drastic action would be taken. "I am a tramway optimist," continued Mr. Fell, "but I realise the enormous developments which have taken place in connection with motor vehicles during the past ten or fifteen years. At the same time I am certain no useful development will ensue until the Government take action to put all these things on a proper basis throughout the country. At present we are tumbling over one another and there is an enormous amount of unnecessary competition. If the Government take a firm hand with the whole situation, we should get the whole of the vehicles used to the best advantage and most economically in our own particular spheres."

Others who took part in the discussion included Lt.-Col. J. Nall, Mr. Carr Thomas, Mr. Frank Pick, Mr. Norman Box (Manchester), Major Strictland, Major T. G. Tulloch, Col. Sinnott, Major E. A Beaumont and Mr. W. Worby Beaumont, who, in proposing a vote of thanks to Sir John Thornycroft, recalled the important work he has done for the industry.

The CHAIRMAN (Mr. E. S. Shrapnel-Smith, C.B.E.) seconded the vote of thanks, and made passing allusion to the development of power alcohol. When one noticed the encouragement given in France and Germany to the production of this, he said, it was a good thing to see our own Government offering a subsidy of 5d. per proof gallon for every gallon produced in this country. It was also encouraging to reflect that the great distilling interests were devoting much time to developments along these lines and that good results were being obtained on our roads with power alcohol, combined with benzol and paraffin. The taxation question must remain thorny, but people who talked of taxation solely in relation to use were far from understanding the necessary lines of enquiry. Use was only one factor, and it was necessary to have regard to the purpose of use. In a personal reference to Sir John Thornycroft, the chairman said that since 1897 no man in the industry had worked harder and more consistently with brain or hands than he.

A VISIT TO DENNIS BROTHERS' WORKS.

At the conclusion of the Transport Congress on May 20 a very enjoyable and interesting visit was paid to Messrs. Dennis Brothers' Works at Guildford. Two handsome coaches took the party out from London and a halt was made by a large mere adjoining the Portsmouth Road, where several of the company's motor fire appliances were giving a demonstration. One machine which attracted much attention was a 200-250 gallon patent turbine hand or trailer-drawn motor fire engine. This is a very handy little equipment on two wheels, especially suitable for small brigades. One of the firm's larger machines, which have been so generally adopted throughout the country and abroad, was also seen "in action," as was a specimen of their street watering and washing machines. Sir Raymond Dennis met the party at Guildford and conducted them over the fine modern offices and works. One was particularly struck with the efficient organisation of the huge plant, the pleasant conditions under which the whole of the employees work, and the provision made for their comfort and recreation. Several Dennis motor vehicles were shown on test ascending a hill near the town, with a gradient of one in six. All the models took the slope without difficulty, including a lorry with a 5-ton load and a 750 gallon water tank, with pump.

Luncheon was served at the White Lion Hotel. Sir Raymond Dennis presided and apologised for the absence of his brother, the senior managing director, who was unable to attend. The chairman extended to the party a hearty welcome to Guildford, whose principal industry was the output of Dennis motor vehicles. It had given him great pleasure to show the guests over the factory and to enable them to see the demonstration of the different vehicles.

In a passing reference to the company's new street washing machine, the chairman mentioned that it was intended to supplant the practice of washing thoroughfares with a hose. Another municipal machine for emptying cesspools and gullies had, according to one purchaser, effected a saving compared with horse appliances, of £481 in eight months. Turning to motor fire engines, Sir Raymond said their models were now being used in many of the principal cities of England and throughout the world. There were over 100 used in London alone. The prosperity of the firm in general was evidenced by the fact that their shares had been higher than those of anyone else in the industry, and they were continuing to pay—which was very unusual—a handsome dividend to the shareholders.

Mr. T. W. A. HAYWOOD proposed "Health and Prosperity to Dennis Brothers," coupled with the name of Sir Raymond Dennis, and the toast was enthusiastically honoured. Mr. W. E. Hobbs, O.B.E. (publicity manager) submitted "The Institute of Transport," referred to its remarkable growth, and coupled with it "The Institution of Municipal and County Engineers."

Mr. E. S. SHRAPNELL-SMITH (a vice-president of the Institute of Transport), in response, alluded to the pioneer work done by Messrs. Dennis Brothers. Mr. Norman Scorgie (president of the Institution of Municipal and County Engineers) gave "The Chairman," and referred to the interest and educational value of the day's visit. In no small measure was the success of the firm due to the efforts of Sir Raymond and his brother.

[A report of other proceedings of the Congress appears elsewhere in this issue.]

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MOTOR AND ROAD PROBLEMS.

NEW INQUIRY BY THE MINISTRY OF TRANSPORT.

At the first annual conference of the National Federation of Hackney Carriage Proprietors, held on May 23 in London, Mr. Dunn, of Liverpool (president), said they had met to consider such questions as the horse-power tax and the import duties on motor parts. They could not procure these parts in England, and they considered it a hardship to have to pay 33⅓ duty on them. There were 20,000 owner-drivers of motor cabs.

Mr. Arthur Neal, Parliamentary Secretary of the Ministry of Transport, remarked that all he could say about matters of taxation was that there was an agitation arising from exactly the opposite point of view. This found expression in the House of Lords the previous week, and it was to the effect that motor owners were not paying enough towards the upkeep of the roads. Local authorities looked with dismay on the present cost of upkeep. Motor owners looked with dismay on the present cost of taxation, but ignored the fact that it did not impose a heavier burden than the petrol tax for which it was a substitute. The Government had set up a Committee to investigate whether there was a fairer way of securing the revenue necessary.

DISCUSSION IN THE HOUSE OF LORDS.

On May 18, in the House of Lords, Lord Harris moved a resolution that the user of roads, both those which as regards width are not suitable as well as those which are suitable for heavy motor vehicles, has become so great, and the financial burden thrown on ratepayers in rural parishes owing to the increased cost of making roads sufficiently strong for such heavy vehicles has become so serious, that the subject is deserving of inquiry by a Committee of Parliament.

Viscount Long, supporting the motion, emphasised the demand for an inquiry by a Parliamentary Committee and not by a Departmental Committee. He did not want to stop coach traffic to the seaside, but he wanted it to be regularised, and wanted to be satisfied that those who used the roads in this way paid their full share of the expense.

Lord Montagu agreed that the present system of road maintenance could not go on much longer.

The Earl of Crawford (First Commissioner of Works and Minister of Transport), in replying, said that the cost of road construction and repair was being reduced. Many of the points raised were unsuitable for inquiry by a Parliamentary Committee; they could be much better dealt with by a technical committee. The Departmental Committee which was dealing with the problem was well qualified to consider what changes were necessary. He recognised that noble Lords desired some form of Parliamentary inquiry, and therefore he would not put the House to the trouble of a division.—The motion was agreed to.

THE COUNTY COUNCILS ASSOCIATION.

Various matters affecting roads and motors were considered at the quarterly meeting of the County Councils Association.

Bedfordshire County Council urged the Association to consider the question of the number of wagons which locomotives should be allowed to draw, with a view to securing uniformity.

The Association decided that the general relaxation of the provisions of Section 3 of the Locomotives Act 1898, which was countenanced during the war, should no longer be permitted, and that the consent of County Councils to the drawing of more than three loaded wagons, exclusive of a water cart, should only be given in exceptional circumstances.

Monmouthshire Council urged that steps should be taken to ensure that the use on the roads of steam locomotives not constructed so as to prevent the emission of sparks shall be effectively prohibited. The matter was referred to a sub-committee.

Regarding heavy traffic, the County Councils of Carnarvonshire, Dorset, Durham, Gloucestershire, Lindsey, Merioneth, and East Riding drew attention to the disproportion between the taxation now payable in respect of heavy mechanical vehicles and the damage caused by such vehicles to the roads, and to the consequent necessity of an increase in the existing scale of licence duties, in order that the cost of road upkeep may be more equitably borne.

It was stated that the Association had already decided to urge that 50 per cent. of the cost of all main roads should be provided from Imperial sources, but refused to recommend any alteration of the motor taxes. Nevertheless the matter was referred to a committee to report upon.

In regard to lights on vehicles, the Association decided to urge upon the Government the desirability of introducing at an early date a Bill dealing with the whole subject.

OMNIBUS SERVICES.

HARROGATE.—Subject to the vehicles, fares, etc., being satisfactory, the Corporation have sanctioned an omnibus service by Messrs. Crossley and Holdsworth to Low Harrogate.

LONDON-BRIGHTON.—It is now possible to journey from London to Brighton daily in 5½ hours at a cost of 6s., with only two changes. From Charing Cross the passenger can travel by the London General Omnibus Company's vehicles to West Croydon Station, from whence the East Surrey Traction Company's service runs to Handcross. At the latter place a change is made into the omnibuses of the Southdown Traction Company. Thos. Tilling, Limited, are continuing their petrol-electric service from London to Reigate, where a change can be made into the East Surrey Company's omnibuses to Handcross.

RIPON.—Arrangements have been made for instituting services of motor omnibuses between Ripon, Thirsk, Aldborough, Grewelthorpe, and Harrogate. The service to Grewelthorpe will open up the Kirkby Malzeard district, where for many years the residents had endeavoured to secure the construction of a light railway.

ROTHERHAM-DONCASTER.—Application has been made to the Ministry of Transport by Rotherham Corporation for consent to the running by their tramways department of omnibuses from Thrybergh tramway terminus to Doncaster Road and the Warmsworth terminus of Doncaster Corporation Tramways.

MOTOR VEHICLES FOR MUNICIPALITIES.

ROTHERHAM CORPORATION have been recommended to purchase a motor sweeper.

BATTERSEA HEALTH COMMITTEE have recommended the purchase of two motor vans.

BRADFORD TRAMWAYS COMMITTEE have purchased a van for the parcels department.

GOSPORT URBAN COUNCIL have decided to purchase a motor ambulance at a cost of about £450.

EAST HAM CORPORATION have a scheme for a motor repair shop and a bulk petrol store at a cost of £12,500.

JOHANNESBURG MUNICIPAL COUNCIL have purchased an Enfield-Vickers 8-H.P. motor cycle and side-car and a B.S.A. motor cycle.

WALTHAMSTOW URBAN COUNCIL have asked the electrical engineer to report as to the provision of a conveyance for the mains engineer.

BILLINGE URBAN COUNCIL have asked a sub-committee to report on the advisability of purchasing a motor vehicle for haulage purposes.

HAMPSHIRE STANDING JOINT COMMITTEE report that as horses and carts become worn out the police superintendents will be provided with motor cars.

HARROGATE CORPORATION have sent back for further consideration a proposal of the Electricity Committee to purchase an electric vehicle at a cost of £940.

A KARRIER SWEEPER has just been ordered for the use of the municipal authorities in Rotterdam after one of these machines had undergone a month's trial.

ROTHERHAM CORPORATION have received a suggestion from the Highways Committee to purchase a motor cycle for a foreman whose time is too valuable to waste in walking from job to job.

CHESTERFIELD LICENSING COMMITTEE have granted Mr. Wm. Simpson a hackney carriage licence for an omnibus to carry 14 passengers, to ply between Barlow and Chesterfield, and to stand at Angel Yard, Chesterfield.

ST. PANCRAS WORKS COMMITTEE have authorised the purchase of a Laffley motor sweeper, which the borough surveyor says is superior from the point of view of reliability and strength of construction to the machines at present in use by the Council.

THE METROPOLITAN ASYLUMS BOARD are considering a scheme for the development of the motor ambulance headquarters, so that all the repairs can be dealt with without delay. The Ambulance Committee of the Board have recommended the purchase from Messrs. Clement Talbot, Limited, of six chassis for the sum of £3,600. The bodies will be built at the Board's own works.

GRIMSBY CORPORATION have been recommended by the Health Committee to accept an offer of the Clayton Wagon Company, Lincoln, to supply an electric street watering vehicle complete, on approval, for three months, or return at the option of the Council, but if they decide to purchase the price to be £1,070. The company will supply at their own cost such improvements as may be fitted by them on other vehicles supplied during the three months.

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MOTOR TRAFFIC NOTES.

SHEFFIELD FIRE BRIGADE.—All the horse-drawn appliances of the Sheffield Fire Brigade have now been supplanted by motor vehicles. The first motor machines were introduced in 1907.

CARS FOR CHURCHGOERS.—The trustees of Brunswick Wesleyan Church, Macclesfield, have decided to place motor cars at the disposal of worshippers who require transport to attend the services.

LEYLAND MAY FESTIVAL.—The old time Leyland (Lancs.) May festival commenced on May 25, and Leyland Motors, Limited, followed a practice which has been in vogue for many years in providing motor coaches for conveying the child dancers in the procession through the village to the festival ground.

PARKING OMNIBUSES AT EPSOM.—Last year 200 of the omnibuses of the London General Omnibus Company engaged for private parties on Derby Day were parked for £5 5s. each. This year the Epsom Racecourse Committee intimated that the fee would be increased to £7. The company therefore asked the hirers to make their own parking arrangements.

PETROL TRACTION ON FRENCH RAILWAYS.—As the result of petrol motor traction on light traffic lines, the French State Railways estimate that a saving of from five to ten francs per kilometre can be made on the cost of steam traction, which exceeds 14 francs. The Prefects of Departments have been asked to study the possibility of applying petrol traction to suitable railways.

MOTOR VEHICLES IN FRANCE.—In his 1923 Budget proposals the French Minister of Public Works gives statistics showing the increase of motor vehicles. In 1913 there were 8,000 motors out of a total of 100,000 vehicles of all categories. At the beginning of 1921 motor vehicles totalled 208,000, of which 93,000 were lorries. As a result of the increase of motors the upkeep of the roads has become difficult and costly.

PROPOSED SPEED LIMIT FOR ST. HELENS.—Considerable opposition was manifested at a meeting of St. Helens Corporation to a proposal of the Watch Committee to apply for a regulation restricting the speed of all vehicles to ten miles an hour, and to require all vehicles to stop when passengers are entering or leaving a tramway car. Ultimately it was decided to consult with the Ministry of Transport as to making suitable by-laws relating to speed.

STANDING PASSENGERS IN LONDON OMNIBUSES.—An investigation has been made by the London General Omnibus Company into the question whether the five extra passengers allowed to stand in their vehicles prefer a strap suspended from the roof or an upright pole for support. The result shows that the upright pole is preferred. It is more readily adapted to the limited head room, and, moreover, is an indispensable part of the structure in the latest type of omnibus.

ORDER FOR ROYAL WARRANT HOLDERS.—Leyland Motors, Limited, the holders of the King's Royal Warrant as manufacturers of commercial motor vehicles, have been honoured by a repeat order for a 3-ton "Leyland" baggage van for H.M. the King. It is understood that a similar machine which has been in service since 1910 has given complete satisfaction. The chassis is a model "C" 3-ton type, with 30-H.P. engine and worm axle. The wheels are shod with Michelin pneumatic tyres.

NEW BENZOLE MIXTURE.—The National Benzole Company is marketing a new benzole mixture made from all-British benzole and petrol. The company is securing its British-controlled petrol through the Agwi Petroleum Corporation, the necessary refineries having been erected near Southampton. The refinery can already handle over 1,000 tons of crude oil per week, a figure which will shortly be increased to 5,000 tons per week. It is understood that the mixture gives a higher yield than that obtainable by previously known processes.

New Type "Bristol" Omnibus for Wakefield (West Riding) Tramways Company.

LONDON OMNIBUS STOPPING SIGNS.—Owing to the diversity of practice on the part of London local authorities in the matter of omnibus stopping signs, the Ministry of Transport recently took up the question with the Metropolitan Boroughs Standing Joint Committee. A series of regulations have been agreed to which will have the effect of standardising the practice. Each stop sign will bear the name of the street in which it is situated, and the design is to be such that it can be fitted to lamp standards if thought preferable. Voluntary stop signs will have a distinguishing band of colour round the column.

THE ANTI-DAZZLE PROBLEM.—Mr. J. W. Walsh, of the National Physical Laboratory, lectured on the problem of glare from motor headlights before the Optical Society on May 11. Some two thousand devices, he said, had been produced, but the problem might still be regarded as awaiting solution. The difficulty lay in the fact that, while a safe driving light required a beam of at least 3,000 candle-power, it was necessary, in order to avoid glare to drivers of oncoming traffic, to reduce this to about 500 candle-power. There appeared to be no satisfactory method of escape from this position of mutually antagonistic requirements. In the United States the problem had been dealt with by confining the main part of the beam to the region below the horizontal. Mr. Walsh emphasised the desirability of uniformity of anti-dazzle legislation throughout the world, and mentioned that the International Commission on Illumination had appointed a special commission to secure this object.

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LONDON, JUNE 17, 1922.

LABOUR DISCONTENT : A WARNING.

There are again signs of restlessness in the tramway industry, the discordant note this time coming from Scotland. The position in Edinburgh has not, it is true, assumed the nature of a deadlock and negotiations are still in progress at the time of writing. A word of warning may not, however, be out of place. It may be assumed that the dissatisfaction is but part of the general ill-content which pervades the mass of workers throughout the country. Yet tramway employees would be well-advised to study the peculiarities of their own particular class of employment and not be led away by the catchwords and the high-sounding though impracticable idealism of the Labour agitator. The prosperity or otherwise of a tramway undertaking naturally depends to a large extent on the capacity of the public to pay the fares charged. The average passenger is now receiving less money than hitherto and has therefore less margin to spend on car rides. That the municipalities themselves have borne their due share of the burden is proved by the large deficits which the majority of them have to face, while the shareholders of the private companies are receiving no higher dividends than those to which they have been accustomed, although the relative purchasing power of the money is less. It would be idle in these circumstances for tramway employees to expect more favourable conditions or higher wages than the industry can afford. They must be prepared to make their contribution to the sacrifice which every citizen is now called upon to make in the process of setting the country on its feet again. The English tramwaymen, we admit, have already gone far in this direction since August last, and it is hoped that their Scottish colleagues will show common sense by adopting a more reasonable attitude. The competition from other types of road vehicle is another factor which tramways have to face, and the employee would do well to remember that only by hard, conscientious and cheerful work can he help to maintain the popularity and efficiency of his own system. On this subject of working conditions and the attitude of the men, some very plain speaking was indulged in on Wednesday by Mr. F. A. Govett, chairman of the Zinc Corporation. "I would say this to Labour," he declared, "that the case is absolutely hopeless if they are bent—as they seem to be at present—on destroying purchasing power, or if they insist on a scale of wages or a scale of living which makes the products they manufacture impossible to sell. There is only one counterpoise to high wages and that is high output, which, of course, means cheap production." No right-minded person will cavil with these words, and Mr. Govett's criticism of trade union methods will find an echo in many places. He admitted the good work the unions have done to improve workmen's lives, but added: "I cannot understand the surrender of all self-determination by capable, ambitious workmen to the leaders of these unions with their infernal policy of 'go slow.' The members are simply not allowed to work out their own salvation." How far this may be true of transport workers we need not attempt to say. The facts are well known, and the warning should not be lost.

LONDON UNDERGROUND EXTENSIONS.

WORK COMMENCED AT GOLDERS GREEN.

A beginning was made at Golders Green on Monday last with the work of extending and reconstructing certain lines of the London Underground railways. At 11 a.m., Lord Ashfield (chairman and managing director of the Underground companies), together with several of his fellow-directors and a number of invited guests, assembled on a plot of land in Golders Green where a commencement was due to be made with the extension of the Charing Cross, Euston and Hampstead Railway from Golders Green to Edgware. Concurrently with this undertaking, further works will be carried out, including a connection between the Hampstead line at Camden Town Station and the City and South London Railway at Euston Station, and also the reconstruction of the latter railway to permit the use of the latest type of rolling stock.

Lord Ashfield, in calling upon Sir Philip Lloyd-Greame, M.P. for the Hendon Division, to turn the first sod, recalled that the work upon that extension was begun just before the war and was then brought to a sudden end. The war alone, however, was not responsible for all their troubles, because there was the very important question of finance. The underground system was not a gold mine, for a very large number of unfortunate people had not yet received a penny on the money they had invested. Only the other day, after about 50 years, a large class of investors received the first dividend upon their money. He hoped their financial difficulties were at an end, for it was not good for any community that their transport system should lag behind. The companies, however, would not have been justified in venturing upon the present big scheme of improvements unless they were able to secure some assistance from an outside source. When they had completed their improvements they would have spent more than £6,000,000, and they appreciated the efforts made by the Government which enabled them to secure the necessary money. It would have been impossible to go on without that assistance from the Government. They had the Government lending its credit so that money could be had on the most advantageous terms, and on the other hand they had all the driving power of private enterprise to make the investment successful. That form of co-operation was a most happy one, for it would not cost the ratepayers a single penny. The whole of the burden involved in that great transaction would fall on the companies themselves.

Sir Philip Lloyd-Greame, M.P., before cutting the first sod, said they looked upon the underground railways as true public servants. The new enterprise would give to the Hendon district just those facilities it needed.

The preliminary work of clearing the ground for the new line as far as Hendon was then entered upon by a large number of workmen. The line will be mainly on the surface. The object of these works as a whole is to provide a through service from Edgware to Clapham Common, thus bringing into being a much-needed connecting link between north-west and south London, and more particularly a direct route between north-west London and the City. One contract has already been placed with Charles Brand & Son for the construction of the line from Golders Green to Hendon, a distance of 1½ miles. This contract covers the erection of brick-arched viaducts, embankments, retaining walls and station buildings. It is hoped to complete the line from Golders Green to Hendon by October 1, 1923, and tenders will shortly be placed for the construction of the line from Hendon to Edgware. The whole extension will be 4.68 miles long and will serve five stations—Brent, Hendon, Colindale, Burnt Oak and Edgware. The rolling-stock will be of improved design and of greater speed than the existing Underground trains.

First Electric Cars at Edinburgh.—The first service of cars on the new electrified system of Edinburgh Corporation will be inaugurated on Tuesday next, over the Liberton-Granton route. The opening ceremony will be performed by the Lord Provost at noon.

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TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

NEXT WEEK'S CONGRESS.

The fourteenth annual congress of the Tramways and Light Railways Association will be held at Bournemouth on Thursday and Friday next, June 22 and 23. According to the programme, which was published in our issue of May 13 last, the delegates will be received by the Mayor of Bournemouth at the Town Hall at 10 a.m., and the Congress will be opened half-an-hour later. The paper to be read on the first day are: "Bournemouth Corporation Tramways," by Mr. I. Bulfin (general manager of the undertaking), and "Railless Traction," by Mr. E. M. Munro. In connection with Mr. Bulfin's paper there will be a demonstration of the Sandberg "In-situ" rail-hardening process at the depot during the morning. The delegates will be the guests of the Mayor at luncheon in the Town Hall, and during the afternoon there will be an excursion by motor omnibus to various centres of interest in and around Bournemouth. Tea will be served at Cuckton Creaks at the invitation of Mrs. Bulfin, and later there will be an informal dinner at the Norfolk Hotel.

On Friday the proceedings will commence with the 25th ordinary general meeting of the Association at the Town Hall. Afterwards, Mr. C. J. Spencer will present a paper on "Modern improvements in tramway rolling-stock." Following luncheon at the Norfolk Hotel, the delegates will be enabled to make a motor coach trip to the New Forest. In the evening, the Mayor and other members of Bournemouth Corporation will be the Association's guests at the Members' dinner.

A reserved restaurant car for the use of members of the Association will be attached to the 6.30 p.m. train from Waterloo Station on Wednesday, June 21.

The papers to be read at the Congress are given in full in our monthly issue of June 15, together with numerous illustrations. These include a detailed drawing of the new railless trolley cars ordered by Mr. A. Baker, the general manager of Birmingham Corporation tramways, for their new railless installation. The cars are described in Mr. Munro's paper.

TAXATION OF MECHANICALLY-PROPELLED ROAD VEHICLES.

DEPARTMENTAL COMMITTEE INVITE SUGGESTIONS.

The Departmental Committee on the Taxation and Regulation of Road Vehicles propose shortly to commence their inquiry into the question of the taxation of mechanically-propelled road vehicles. The committee have decided to confine their attention for the present to the investigation of alternative methods of taxation, leaving the question of incidence of tax to be dealt with later.

Suggestions are invited through motoring or other organisations for alternative methods of taxation to that at present in operation, which will produce a gross annual sum of approximately £10,250,000, exclusive of receipts in respect of licences for horse-drawn vehicles, fees for drivers' licences, and penalties for offences. It is essential that all schemes submitted should be restricted to definite *methods* of taxation only. They should show precisely the proposed method or methods, and should be accompanied by a detailed estimate of the receipts therefrom, both gross and net. The administrative difficulties in connection with, and the cost of, collection of duties in respect of mechanically-propelled vehicles are of great importance, and any scheme submitted should be accompanied by a memorandum showing the proposed method of collection. The present approximate costs of collection, including registration of vehicles and the issue of drivers' licences, is £350,000 per annum. Any increase in this figure under any alternative system will, of course necessitate a compensating increase in the gross receipts.

Communications should be sent to Mr. S. J. Pool Godsell, secretary of the committee, at the Ministry of Transport, 7, Whitehall Gardens, S.W.1, by September 1 next.

TENDERS FOR PEKING TRAMWAYS.

Further information has now been published concerning the new Peking Tramways Company, to which brief reference was made in our issue of March 11 last. The company, which is entirely Chinese, has announced its capital to be four million dollars, half of which was to be subscribed by the Chinese public and half by the Government. Public subscriptions totalled two million dollars, and the first call was therefore for 500,000 dollars from the public and a like amount from the Government.

Tenders have been received for the supply of power plant, machinery, rolling-stock, and accessories from the following firms:—Siemens (China); Innis and Riddle; British Electrical and Engineering Co. of China, Ltd., Australia House, W.C.2; Mitsui Bussan Kaisha; Arnhold Bros.; Jardine, Matheson; Anglo-French (China) Corporation; Compagnia Italiana d'Estreme Oriente; Chinese Commercial Corporation; Zedelius, Westphal & Co.; Sintoon Overseas Trading Co.; Reiss & Co.; Wah-Chang Trading Co.; Liang Mao Trading Co.; Andersen, Mayer & Co., and William Forbes & Co. It is understood that these tenders are being examined by a commission of experts, though in view of the present disturbed state of the country some delay may be experienced in the commencement of the constructional work.

There are eleven directors of the company—six appointed by the Government and five by the Chinese shareholders, and they have met on many occasions. The company is governed according to Chinese law.

MISCELLANEOUS NEWS AND NOTES.

Bradford "Railless" Powers Opposed.—Keighley Town Council are opposing the powers sought by Bradford Corporation to operate railless trolley vehicles on routes beyond the city boundaries.

West Bromwich Tramway Reconstruction.—The Town Council have decided to apply for sanction to borrow £75,000 for the reconstruction of certain tramway routes. The work will be carried out by direct labour.

Conductors for Motor Coaches.—Hove Corporation Licensing Committee have recommended that when motor coaches carry 20 or more passengers a conductor should accompany each vehicle, in addition to the driver.

Birkenhead Tramways Experiment.—The Birkenhead Tramways Committee have decided to construct a covered top on one of the Higher Tranmere cars, as an experiment, at a cost of £170. As the cars on this route have open upper decks.

Proposed Track Reconstruction at Burnley.—The Burnley Tramways Committee have recommended an application to the Ministry of Transport for a loan of £46,950 (less £9,450 sinking fund contributions outstanding on work to be superseded), for relaying 9,390 yards of track.

School-Children's Interest in "Safety First."—No fewer than 130,000 London schoolchildren have entered for the competition held this year by the London "Safety First" Council. This is an increase of 25,500 scholars compared with last year.

Omnibuses Suggested for Greenock.—Greenock Corporation Tramways Committee are considering the desirability of instituting an omnibus service for the convenience of residents in the outlying and upper parts of the town. The Greenock and Port Glasgow Tramways Company have asked the Corporation to submit proposals to them.

Longer Stages Proposed at Salford.—Salford Tramways Committee have recommended the Borough Council to extend the distance of the penny fare on the tramways from a mile to a mile and a quarter. The Manchester Corporation tramways recently increased the length of their penny stage from 1¼ to 1½ miles. Alderman Barrett (chairman of Salford Committee), said penny fares would not pay on the omnibuses.

Mishap to Glasgow Car.—A Glasgow Corporation tramcar containing many passengers was travelling down a declivity in West Nile Street on Saturday last when it was struck at right angles by a heavy motor lorry. The car left the rails, crossed over the other set of lines, and came to a standstill against the kerb on the opposite side of the street. No one was injured, but the rear portion of the car was badly damaged.

Proposed Leicester Extension.—The Corporation has approved plans for the construction of a double line of tramways from the Groby Road corner, along Blackbird and Abbey Park Roads, to the car sheds, which will give an alternative avenue of approach. The estimated cost of the work is £60,000, and borrowing powers for this sum are to be sought.

Drop in Steel Prices.—Mr. T. P. Sykes, general manager of Rotherham Corporation tramways, has reported to the Tramways Committee that last year an order was placed with Steel, Peech and Tozer, Ltd., for 400 tons of steel rails, 200 tons to be delivered in 1921 and the balance in the current year. The price of the original 200 tons was £27 15s. per ton. The remaining 200 tons will be delivered at £12 10s. per ton.

Brighton Corporation Tramways.—The total revenue for the year ended March 31 was £125,212, a decrease of £6,265. Working expenditure (including all renewals) amounted to £102,888, as against £110,674 last year (excluding track renewals), a decrease of £7,786. After paying interest, sinking fund, and income tax, there remains a balance of £5,538 as against £2,386. This sum has been carried to deferred renewals charges account.

Glasgow Tramways Relief Work.—The Glasgow Tramways Department has been employing men each alternate week on relief work, and under an arrangement with the employment exchange these men receive an out-of-work donation for the week of enforced idleness. The Ministry of Labour has decided that this practice must be discontinued, and the men employed on such terms are not to be given the out-of-work donation in future.

L.C.C. Tramways Map and Guide.—A new edition of this very useful map has been issued and copies are supplied to the public free upon application at the tramways offices, 23, Belvedere Road, S.E.1, or at the public libraries. The map is well printed in colours and all the London County Council tramways within the county are clearly shown on the map with route numbers, as are also connecting services, including the recent extensions to Kew Bridge and Wimbledon.

New Volume of Railway Statistics.—The Ministry of Transport issued on Thursday a large new publication bearing the title: "Railway statistics in regard to selected commodities conveyed by freight trains on standard gauge railways of Great Britain during certain periods in 1920 and 1921." Sir George Beharrell (Director-General of Finance and Statistics at the Ministry) said the book, whose future publication will be governed by the demand now made for it, gave for the first time real knowledge as to the movement of traffic—what was moving, how far it moved and what was being paid for its transit. From the figures given, it is possible to determine the average length of haul and the average railway receipts per ton mile of any commodity, information which will be essential to the Rates Tribunal when revising standard charges. The book is foolscap size, has 360 pages, and costs 30s.

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Tramway Standards Unsuitable for Advertisements.—Blackpool Tramways Committee recently received an offer to place advertisements on the tramway standards. After careful consideration the Committee has now decided that the standards are unsuitable for advertisements, as the disfigurement to the streets would outweigh any monetary advantage to be derived from the scheme. There was also a possibility of danger to the public, and for these and other reasons it was felt that the offer ought not to be entertained.

Institute of Transport Appointments.—The following appointments for the year 1922-23 have been made by the Council:—Honorary President, Lord Ashfield; President, Sir Sam Fay; Past Presidents, Sir Eric Geddes and Sir Henry P. Maybury; Vice-presidents, Sir J. G. Broodbank, Sir Lynden Macassey, Sir Henry W. Thornton, Mr. H. H. Gordon, Mr. E. S. Shrapnell-Smith, and Mr. Arthur Watson; Honorary Treasurer, Sir Philip Nash; Honorary Solicitor, Sir William Joynson-Hicks, Bart.; Honorary Secretary: At the express wish of the Council, Mr. H. E. Blain has consented to retain the office of hon. secretary for another year.

North Eastern Railway Electric Locomotive.—The large new electric passenger locomotive of the North Eastern Railway has gone through some trials that are reported to be quite successful. The machine was constructed to haul an express train of 450 tons at an average speed of 65 m.p.h. The trials indicate that the full horse power of 1,800, one hour rating, or 1,260 h.p. continuous rating, could be developed. Sir Vincent Raven, chief mechanical engineer of the North Eastern Railway, has stated that he is satisfied that if the locomotive is put on the main line it will be able to haul heavy passenger traffic up the gradients at higher speeds than steam engines can do, and that it will maintain a higher average without running excessive speeds on level roads and down gradients.

Government and London Underground Extensions.—In the House of Commons on Monday, Sir J. Baird, replying to Mr. J. D. Gilbert, said there was no question of a capital advance by his Majesty's Government to the London Underground Railway Company. The Treasury had agreed to guarantee principal and interest of issues of debentures to be made by the London Electric Railway Company and the City and South London Railway Company up to a combined total of £6,000,000. The terms of the issues would be subject to the approval of the Treasury, and were not yet finally determined. No condition had been imposed as to a sinking fund, but the company, in the Bill now before the House, were seeking power to create a fund for redemption purposes. No specific conditions had been made as to the number of men to be employed, but it had been stipulated that the work should be started as soon as possible.

The Engineers' Lock-out Ends.—The dispute in the engineering industry is practically at an end. On Tuesday morning the result of the ballot of members of the Amalgamated Engineering Union on the modified terms put forward by the employers was declared: for acceptance, 75,478, against, 39,423, leaving a majority in favour of acceptance of 36,055. The dispute began early in May, and the payments made by the unions have severely strained their resources. Work has already been resumed on a fairly extensive scale. Metropolitan-Vickers Electrical Company, for instance, expect to employ 4,500 men within a short time, and a large number of other companies are taking on men with a fair degree of rapidity. The difficulty of the employers is the high cost of production. In most foreign countries the production costs seem to be lower, and it is exceedingly difficult to secure foreign orders under these conditions.

Municipal Tramway Managers' Meeting.—The Managers' Section of the Municipal Tramways Association met at the City Chambers, Glasgow, on Thursday morning, when Bailie M'Whirr welcomed the delegates, of whom about 50 were present. Treasurer Kelly and Bailie Izett also joined in the welcome. Mr. J. B. Hamilton, of Leeds, thanked the Corporation for their welcome, and said that by the example set by Glasgow in 1894 the whole history of municipal enterprise had been very much altered. Mr. Alex. Gerrard, works manager of the Glasgow Corporation tramways, spoke on the maintenance of rolling stock. The delegates were entertained to luncheon at the City Chambers, and in the afternoon a visit was paid to Coplawhill tramway works. The delegates later went to Aberfoyle, where they dined. The conference was resumed on Friday, when Mr. R. Beattie, manager, claims and legal department of Manchester City Tramways, discussed the prevention of accidents.

Railways' Road Transport Bill Dropped.—Owing to the opposition of the Ministry of Transport to vital portions of the London and North Western and the Midland Railway Companies' Bill, seeking powers to carry goods by road, the withdrawal of the Bill was announced in the Select Committee on Monday. At the chairman's request the promoters took half an hour to reconsider their decision, but subsequently the Bill was definitely withdrawn. Much surprise is caused by the decision, because most of the interests that were opposed to it had been satisfied. The Ministry of Transport desired to enact that the charges to be made by the railways for the carriage of goods by road should not be lower than their charges by rail, and to this the companies could not consent. The statement made by Sir George Beharrell before the Parliamentary Committee in regard to rates came as a complete surprise, as there had never been any suggestion that the Ministry held that view. The companies naturally regarded the condition as impossible. One thing is clear, and that is the road transport companies are at present free from any fear of railway competition, and if they combine they can apparently charge what rates they think fit.

Scottish Tramway Employees' Wages.—Edinburgh Corporation tramway employees have decided to inform the Tramways Committee that they cannot accept the recommendations as to working conditions of the Scottish Tramways Association. This decision was reached on Saturday last after the men had received a report from a deputation which had waited on the general manager (Mr. R. S. Pilcher). The employees assert that part of the clauses have no application to the Edinburgh undertaking. They say they cannot agree to work under the operation of recommendations which have been drawn up to cover other undertakings in the country, and are making application, through the Tramway Committee, with a view to the drafting of a fresh agreement. The men readily admit that the terms of the 1919 agreement, under which they were working, stood in need of revision, and they have no objection to discussing a fresh agreement, but they object to being saddled with conditions which do not apply to Edinburgh. In regard to Sunday time, the old tramway company, the men point out, paid time and a half, and they see no reason why a change should be made now. The men have appointed a sub-committee to draft a revised agreement to submit to the Tramways Committee. Meanwhile they ask the committee to suspend the operation of the recommendations of the Scottish Tramways Association. Glasgow Town Council, on June 8, approved a recommendation that the wages of motormen and conductors be reduced by 5s. per week. The District Secretary of the Transport and General Workers' Union intimated that the men had agreed to a reduction of 3s., coming into operation from the first pay period of this month, but asked the Corporation to remit back to the Conditions of Service Committee the second reduction of 2s. to take effect from July 1.

GLASGOW CORPORATION TRAMWAYS YEAR.

The financial year for all Glasgow Corporation departments closed on May 31. The following are traffic and other statistics for the tramways department for the year:—

Average Track Mileage open during year (single) ... 197½

	Total.	Inc. or Dec.
Car mileage	27,024,529	+121,655
Traffic revenue	£2,347,218 5s. 7d.	—£41,226 0s. 10d.
Traffic revenue per car mile ..	20.845d.	—.462d.
Traffic revenue per passenger ..	1.306d.	+.025d.
Passengers carried	431,372,473	—16,229,338
Passengers carried per car mile ..	15,962	—.676

The following statement gives the number of passengers carried at each fare:—

Fares.	Year to May 31, 1922.	Per-centage.	Fares.	Year to May 31, 1921.	Per-centage.
¾d.	81,258,481	18.84	¾d.	92,227,336	20.60
1d.	163,777,422	37.97	1d.	171,519,560	38.32
1½d.	118,589,163	27.49	1½d.	118,437,023	26.46
2d.	42,602,980	9.88	2d.	41,217,253	9.21
2½d.	12,361,846	2.87	2½d.	11,899,790	2.66
3d.	6,414,445	1.48	3d.	6,003,675	1.34
3½d.	2,896,161	.67	3½d.	2,789,744	.63
4d.	2,296,728	.53	4d.	2,553,432	.57
4½d.	—	—	4½d.	405,342	.09
5d. and over	1,175,247	.27	5d and over	548,656	.12
	431,372,473	100.00		447,601,811	100.00

The weight of copper received during the year was 709 tons, and the weight of silver was 149 tons.

Since July 1, 1894, to May 31, 1922, the total passengers carried at each fare, with percentages, are as follows:—

Fare.	Passengers.	Percentage.
½d*	2,979,537,218	42.03
¾d.	173,485,817	2.45
1d.	2,908,005,756	41.02
1½d.	660,312,288	9.31
2d.	218,946,730	3.09
2½d.	71,578,534	1.01
3d. and over	77,255,011	1.09
Total	7,089,121,354	100.00

* Includes old two-stage tickets.

The miles run aggregated 519,021,493, and the traffic revenue £26,689,743 1s. 3d.

FINANCIAL.

Bank Rate Reduction.—On Thursday the Bank rate was reduced from 4 to 3½ per cent. Following the reduction, the bankers have reduced their rates to depositors by ½ per cent. to 1½ per cent. We have not had so low a rate since 1914, when it was 3 per cent. up to July 30. The rate reached high-water-mark at the outbreak of war in August, 1914, when the rate was raised to 10 per cent., to be reduced to 6 per cent. two days later. The reduction should be good news to traders who are accommodated by bankers at various rates.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended June 14 amounted to £94,978, a decrease of £11,054 compared with the corresponding period last year. The route length was 160.73 miles, as compared with 152.52 a year ago. From April 1 (the commencement of the financial year) to June 14 (10½ weeks), the total receipts were £1,027,923, a decrease of £79,143 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended June 3 give total receipts of £376,978, or £10,209 more than in the corresponding week of last year. The total length of track included

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in the returns was 1,948 miles. Receipts this year were at the rate of £193 10s. 4d. per mile of single track, and last year at the rate of £188 5s. 7d., thus showing an increase for the week of £5 4s. 9d. per mile open.

Brazilian Traction, Light and Power Co.—The directors of the Brazilian Traction, Light and Power Company, Ltd., at a meeting in Montreal on June 9, decided to resume the payment of dividends, and 1 per cent. will be paid on September 1. The last dividend was paid in January, 1917. It had been anticipated for some time that the company would resume its 4 per cent. dividend rate, but the Brazilian exchange has remained so low that a favourable decision by the directors has been postponed from time to time. The traffic receipts of the company continue to increase, and under normal conditions shareholders would, no doubt, receive some compensation for the five years' suspension of dividends.

PERSONAL.

Mr. G. H. Swingler, city electrical engineer of Capetown, is about to visit England on leave.

Mr. Richard Enright, the New York Police Commissioner, and **Colonel Thompson,** chairman of the New York Traffic Committee, are visiting Europe to study methods of traffic regulation.

Mr. Percy G. Campling, deputy engineer and manager of the Rhondda Tramways Company, has been appointed general manager of Yarmouth Corporation tramways at a salary of £400 per annum. There were 119 candidates.

Mr. J. H. Taylor, assistant engineer of the Central Argentine Railway, has been awarded the "George Stephenson" medal, the gold medal of the Institution of Civil Engineers, for his paper on "The Application of Electric Traction to the Suburban Lines of the Central Argentine Railway."

Mr. Duncan P. Morrison, the former manager and engineer of Tynemouth and District Electric Traction Company, who recently retired, has been presented with a silver tea service and tray by the staff. Mr. J. A. Somerville (late of Swansea), the newly-appointed manager, presided over the gathering, and Mr. J. Davidson, the oldest member of the staff, made the presentation. Mr. Morrison, in returning thanks, paid a tribute to the loyal assistance he had always received from the staff.

Mr. Clement Jackson, motor omnibus superintendent of Sheffield Corporation tramways, has been appointed general manager of Keighley Corporation tramways in succession to Mr. J. A. Bromley, who has accepted the managership of the York undertaking. Mr. Jackson, who is 29 years of age, received his training at Sheffield. His salary will be £400 a year. There were 92 applicants for the position, and those selected for interviews in addition to Mr. Jackson were: Mr. Colin Milton, B.Sc., assistant tramways engineer and manager to the Eccles Corporation; Mr. Thomas Godley, deputy engineer and manager, Dumbarton Burgh and County Tramways, and Mr. J. R. Taylor, deputy manager of the Walsall Corporation tramways.

CONTRACTS.

Motor Car for Dundee Tramways.—Dundee Tramways Committee have decided to buy a second-hand two-seater motor car for £200.

Sheffield Tramways Committee have accepted the tender of H. Bessemer and Co., Ltd., for 400 steel tramcar tyres at £2 17s. each.

The British Thomson-Houston Company's tender for a rotary converter, switchgear, etc., at £2,753, has been accepted by York Corporation.

Messrs. Cammell, Laird & Co. have received orders for 400 all-steel covered goods wagons, 150 for the Great Indian Peninsula Railway, and 250 for the Assam-Bengal Railway.

Cars for Melbourne. A Reuter's telegram states that the Melbourne Tramways Board propose shortly to invite tenders for the supply of 60 single truck electric tramcars, the delivery to be spread over a period of two years.

Wolverhampton Tramways Committee have accepted the tenders of Messrs. Eadie Towers & Co., of Wolverhampton, for the construction of the tramway track in Waterloo Road (from Darlington Street to Newhampton Road), amounting to £3,871 14s. 7d., and of the Rail Welding Co., Ltd. (of London), for welding the joints of the new track to be laid in Waterloo Road, and welding and re-treading joints in the portion of the track where maintenance work is to be executed during this summer.

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ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

Names.	Week ended.	Latest Return. 1921.	1922	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	June 7	2,753	3,727	+ 974	1½	3,927	+ 1,174
" Motor Buses	" 7	634	236	— 398	1½	246	— 388
Ayr Corporation ..	" 10	705	685	— 20	4	2,549	— 23
Barrow Corporation ..	" 10	863	847	— 16	10	6,296	— 2,682
Belfast City	" 9	14,024	11,381	— 2,643	10	118,900	— 12,499
Birkenhead Corporation	" 11	2,303	2,641	+ 338	10¾	26,219	+ 595
" Motor Buses	" 11	797	1,098	+ 301	10¼	7,6[illegible]2	+ 650
Birmingham Corporat'n	" 3	28,255	29,112	+ 857	9	263,984	— 13,487
" Motor Buses	" 3	2,143	2,056	— 87	9	17,026	— 3,392
Blackburn Corporation	May 31	1,445	2,766	+ 1,321	9½	23,341	+ 3,850
Bradford Corporation	June 10	11,258	17,014	+ 5,756	11	147,467	+ 12,884
Burnley Corporation ..	" 10	3,014	3,851	+ 837	..	..	..
Burton-on-Trent Corp.	" 11	575	611	+ 36	10	5,740	— 564
Bury Corporation ..	" 11	2,230	3,039	+ 809	10¼	26,373	+ 1,392
Chatham & District ..	" 1	1,485	1,886	+ 401	22	33,977	— 1,767
Chesterfield Corporatn.	" 5	1,299	1,383	+ 84	9	12,007	— 1,017
Derby Corporation ..	" 10	1,618	2,537	+ 919	10	22,237	+ 1,222
Dundee City	" 7	3,592	3,220	— 372	3¾	10,360	— 1,088
East Ham Corporation	" 10	2,095	2,434	+ 339	10½	22,354	+ 914
Edinburgh Corp. Trys.	" 3	13,375	13,227	— 148	3	37,696	— 2,425
" Motor Buses	" 3	4,271	3,906	— 365	3	11,193	— 1,598
Glasgow Corporation	" 10	50,183	46,202	— 3,981	1½	68,461	— 4,513
Glossop (U.E. Sup. Co.)	" 10	196	247	+ 51	23	5,254	— 149
Halifax Corporation ..	" 6	3,736	6,416	+ 2,680	9½	43,509	+ 3,632
" Motor Buses ..	" 6	99	93	— 6	9½	609	— 434
" Railless Cars ..	" 6	..	107	..	9½	591	..
Huddersfield Corp. ..	" 10	5,442	6,907	+ 1,465	11	60,297	— 1,640
Ilford U.D. Council ..	" 10	1,598	1,689	+ 91	10½	15,592	— 112
Ipswich Corporation ..	" 10	771	1,020	+ 249	10	8,548	+ 560
Isle of Thanet	" 7	1,072	1,699	+ 627	35⅔	24,813	+ 1,388
Kilmarnock Corporatn.	" 10	363	334	— 29	3½	1,254	— 207
Leicester Corporation..	" 10	5,658	8,312	+ 2,654	23	169,447	+ 32,970
Liverpool Corporation	" 10	28,152	32,721	+ 4,569	23	672,525	+ 39,050
London County Council	" 14	106,032	94,978	—11,054	10½	1,027,923	— 79,143
Maidstone Corporation	" 8	415	569	+ 154	9½	5,017	+ 187
Manchester Corporation	" 10	40,994	36,775	— 4,219	10	373,839	— 32,566
Newcastle-on-T. Corp.	" 3	10,656	10,541	— 115	9	91,435	— 7,303
Nottingham Corp. ..	" 8	3,801	8,779	+ 4,978	10	77,574	+ 24,416
Oldham Corporation ..	" 11	4,587	5,045	+ 458	11	52,890	— 1,388
Preston Corporation ..	" 7	1,928	2,172	+ 244	9⅔	17,929	— 883
" Motor Buses ..	" 7	..	153	..	9⅔	1,275	..
Reading Corporation ..	" 8	1,440	1,845	+ 405	10	15,706	+ 773
" Motor Buses ..	" 8	380	486	+ 106	10	3,479	+ 56
Rotherham Corporation	" 5	1,994	2,356	+ 362	9	19,572	+ 749
Salford Corporation ..	" 11	10,808	13,170	+ 2,362	10¾	111,505	— 3,942
Sheffield Corporation ..	" 11	21,995	20,828	— 1,167	10¼	191,083	— 7,580
Southampton Corp. ..	" 7	2,224	3,898	+ 1,674	10	30,870	+ 5,530
" Motor Buses	" 7	426	97	— 329	10	977	— 1,909
Southend-on-Sea Corp.	" 7	2,044	3,749	+ 1,705	10	23,823	+ 6,449
South Shields Corp. ..	" 10	1,584	2,231	+ 647	10	17,733	+ 2,119
St. Helens Corporation	" 6	1,849	1,937	+ 88	10	15,697	— 1,483
Sunderland Corporation	" 11	2,471	3,156	+ 685	10	26,327	+ 1,377
Swindon Corporation ..	" 7	389	437	+ 48	9⅔	3,610	— 311
Tyneside Trys., Trds...	May 31	1,212	961	— 251	22	18,006	— 8,430
Wallasey Corp. ..	June 10	2,839	3,348	+ 509	10½	27,078	— 803
" Motor Buses ..	" 10	270	340	+ 70	10½	2,497	+ 21
Walsall Corporation ..	" 10	1,592	1,792	+ 200	10	16,750	— 364
" Motor Buses ..	" 10	789	1,240	+ 451	10	9,432	+ 138
Walthamstow U.D.C...	" 10	2,314	2,622	+ 308	10½	20,582	— 1,841
Warrington Corp. ..	" 8	857	1,006	+ 149	10	9,785	+ 294
West Ham Corp. ..	" 8	5,417	6,529	+ 1,111	9¾	57,908	+ 639
Wolverhampton Corp.	" 14	2,167	2,031	— 136	11	24,325	— 756
" Motor Buses	" 14	618	613	— 5	11	7,314	+ 439

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

Name.	Week or M'th.	Latest Return. 1921.	1922.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	June 10	£79,776	83,945	23	£1,935,599	+ 78,953
Ballarat & Ben. (4 wks.)	Mar. 26	4,935	5,244	52	60,698	+ 3,525
Brazilian Traction (Mlrs)	April	13,562,000	15,413,000	17	60,156,000	+ 8,676,000
Brisbane	April	47,750	48,700	17	192,590	+ 9,055
British Columbia $	April	835,793	818,177	43	8,589,842	+ 122,528
Buenos Aires Lacroze ..	May	58,492	59,278	48	638,716	+ 9,272
Burmah Tr. & Lght. Rs.	April	50,159	58,631	39	522,054	+ 63,796
Calcutta .. Rs.	June 10	87,345	107,286	23	2,443,871	+ 782,219
Cape Town	April	27,662	28,657	..	..	..
Carthagena & Herrerias	May	1,602	2,793	21	13,777	+ 904
Cordoba	Mar.	21,717	25,382	52	277,368	+ 39,922
East India	May	4,392	3,960	43	41,042	— 1,337
Kalgoorlie ..	Mar.	2,485	2,390	13	6,601	+ 1,652
La Plata ..	Mar.	*3,403	7,067	13	20,109	+ 9,471
Madras (2 weeks) Rs.	May 15	*51,072	48,603	19	444,842	+ 148,890
Manila .. .. $	April	279,534	286,044	17	1,189,893	— 15,816
Montevideo	May	46,579	48,074	30	327,493	— 5,963
Para	April	22,289	23,061	21	112,507	— 1,000
Pernambuco	June 11	3,575	3,485	23½	81,284	— 16,882
Port Elizabeth	April	7,082	6,892	..	..	..
Rangoon .. Rs.	Mar.	158,121	150,500	13	418,933	+ 17,536
Shanghai .. $	April	157,500	184,500	17	720,217	+ 94,478
Singapore .. $	May 27	11,519	10,962	21	298,984	+ 39,831
Winnipeg .. $	April	462,378	435,058	17	1,871,392	— 52,548

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

Common Fund Companies.		
Metropolitan District Rly. Co. ..	Week ending June 10, 1922 ..	£260,368
London Electric Rly. Co.	Corresponding week last year ..	251,405
City & South London Rly. Co. ..	Increase	8,963
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	5,121,349
London General Omnibus Co., Ltd.	Corresponding period last year ..	5,413,695
	Decrease	292,346

London & Suburban Traction Group		
Metropolitan Elec. Tramways, Ltd.	Week ending June 10, 1922 ..	£64,370
London United Tramways, Ltd.	Corresponding week last year ..	59,826
South Met. Elec. Tr. & Ltg. Co., Ltd.	Increase	4,544
Tramways (M.E.T.) Omnibus Co., Ltd	Aggregate from Jan. 1 to date ..	1,118,164
	Corresponding period last year ..	1,212,928
	Decrease	94,764

	Passenger.	Goods.	Total.
METROPOLITAN RAILWAY			
Week ending June 10, 1922 ...	£35,566	£2,865	£38,431
Total Receipts (23 weeks) ...	757,535	84,943	842,478
MERSEY RAILWAY			
Week ending June 10, 1922 ...	—	—	£4,376
Total Receipts (23 weeks) ...	—	—	104,966

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THE
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LONDON, JUNE 24, 1922.

RAILLESS TRACTION AND TRAMWAYS.

The paper read on Thursday at the Bournemouth Congress of the Tramways and Light Railways Association on railless electric traction, and the fact that the new railless route of Birmingham Corporation tramways will shortly be opened, have served to direct further attention to this form of road passenger transport. Mr. Munro's paper, which was published in our issue of June 15, together with detailed drawings of the new Birmingham cars, has aroused much interest that was reflected in the animated discussion following its presentation to the Congress. This railless route at Birmingham will be notable for two reasons: it represents the first instance of the conversion of a tramway route to the railless system, and further, the rolling stock is to consist entirely of double-deck cars. On this—the Nechells—route of two and a half miles, it is estimated that the saving in capital cost will obviate a loss of £3,000 per annum which the reconstruction of the tramway track would have entailed, while an annual profit of a similar amount is expected to accrue from the adoption of railless traction. In a few weeks' time, when the rolling stock is completed, the tramcar service on the Nechells route will be entirely superseded by a full service of railless trolley cars, with probably a greater frequency and a high average speed. This forthcoming event prompts us to recall that since 1904 we have closely watched the development of the railless system. In May of that year, commenting on the early lines in use on the Continent, we noted the "distinct progress" which this method of traction had made, and stated that "At the present moment its special application would appear to be along suburban roads or coach roads connecting several towns and villages. On many such roads it is doubtful whether the great expense of laying tramway rails is justifiable, for on an electric tramway system by far the greatest expense is the track, with its contingent expenses." This point of view seems to have been amply substantiated by experience since that time. Although the application of the railless system in this country has been marked by a good deal of delay, since the Leeds and Bradford systems were opened just eleven years ago tramway managers have shown a readier disposition to consider railless as an alternative form of traction in special circumstances, and routes have been successfully inaugurated in several places—mostly in the North of England. Certainly the method has much to recommend it for suburban districts, where the laying of expensive tramway tracks is not justified by the traffic expected, but where the demand for transport facilities has nevertheless to be met. Railless, indeed, forms an admirable adjunct to a tramway service, and all the preparation which needs to be made is the overhead equipment, with the erection of which the department is, of course, already familiar. Although railless traction is supplanting tramways on the Birmingham route mentioned, the public should not jump to the conclusion that such a change is likely to become general. The fact remains that there is no other form of traction so cheap as "the metal wheel on the metal rail." Whenever the fully-equitable cost of maintaining a roadway has to be met by a street transport undertaking, it will be found that the tramway operating cost will compare very favourably with that of any other system. At the same time, owing to the heavy capital cost of tramway permanent way, it is clear that the railless system has a field of its own.

EDINBURGH ELECTRIC CAR SERVICE.

FIRST ROUTE IN OPERATION.

The formal opening of the first electrified route of Edinburgh Corporation tramways, which hitherto had been operated on the cable system, took place on Tuesday, when Lord Provost Hutchison drove the first car over the Nether-Liberton to Pilrig route. Shortly before noon a large party of members and officials of the Corporation and invited guests were conveyed in Corporation motor omnibuses to the new depot at Leith, where the recently-acquired electric cars were inspected. These had been gaily decorated for the occasion. The official party included: Lord Provost Hutchison and Mrs. Hutchison, Councillor C. J. Mancor (convener of the Tramways Committee), many members of the Committee and of the Town Council, Mr. R. Stuart Pilcher (general manager of the Corporation tramways), the Town Clerk, the Chief Constable, Sir Robert Cranston, Sir George M'Crae, Mr. Manclark (Moderator of the High Constables), and several other municipal officials. Among the invited guests were the Convener of Aberdeen Tramways Committee (Councillor D. W. Beaton), and the general manager (Mr. W. Forbes), the convener of Dundee Tramways Committee (Mr. J. G. Fraser), and the general manager (Mr. W. T. Young), the manager of Musselburgh Electric Traction Co. (Mr. H. C. Babb), and representatives of private firms, including Mr. McArthur and Mr. Cunliffe, of the Metropolitan-Vickers Electrical Co., and Mr. Menzies, of the North British Steel Foundry.

The Lord Provost took his place at the controller of the first official car, switched on the current, and, amid the cheers of the gathering, drove the car out of the depot. At Pilrig a dense crowd of people gave the car and the party on board a cordial welcome, and the vehicle broke a broad blue ribbon which had been stretched across the roadway. Souvenir tickets were punched by the conductor and handed to each councillor and guest. At Nicolson Street the successful progress of the car was marred by the behaviour of a body of medical students who boarded the vehicle—even to the roof—and boisterously assailed the whole party with bags of flour. The intruders were later forcibly removed by the police.

At a subsequent luncheon in the City Chambers, Sir George M'Crae proposed "Success to the Tramway Undertaking." He repudiated the criticism that by embarking on large capital expenditure for tramways they were damaging the financial reputation of the city. In his opinion it was entirely the other way. He congratulated Councillor Mancor on the enthusiasm, energy, and industry he had brought to his task.

Councillor Mancor gave an interesting survey of the position of the city tramways, and said they were that day celebrating the jubilee of their undertaking, as it was a little over 50 years since the first car was introduced in Edinburgh. Referring to the first instalment of the electric car system, he said he had always maintained it was the most economical and efficient method of transport known to modern engineering. Edinburgh was the first city in Scotland to adopt the high speed type of motor. As a result of experiments with this motor in Leith, combined with lighter equipment, they were not going to use nearly as much current as they originally thought necessary.

Alluding to fares, Councillor Mancor said out of every penny they collected in fares, at least a halfpenny went in wages. That would give them an indication of how much their hands were tied when they were asked that fares should come down to pre-war level. They would certainly never under any condition tolerate the tramways going on the rates. They must be made to pay, and

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they must have fares that would assure that the two sides of the account would balance. Councillor Mancor handed a silver model of an electric car, the gift of the Corporation, to the Lord Provost.

In proposing the health of the tramways manager, Lord Provost Hutchison described Mr. Pilcher as a loyal, diligent and very active servant of the Corporation, who had carried on often in the face of considerable difficulty. He had now embarked on a new system, and they were sure he would make it a success.

Mr. Pilcher, in reply, said it had frequently been declared that the expenditure of three-quarters of a million would ruin the tramway undertaking. The expense of running an electric system was, however, so much less than that of a cable system that they would doubtless be able to reduce working expenses. The difference in operation between an electric and cable system at the present time was 5d. a mile, and he had no doubt that in the first month that fivepence of difference would be clearly shown. The estimates for electrification were put forward at a time when prices were very high. The cost of equipment was now down £500 per car, which represented on the present system a reduction of £117,000.

TRAMWAYS AND LIGHT RAILWAYS ASSOCIATION.

ANNUAL CONGRESS AT BOURNEMOUTH.

The annual congress of the Tramways and Light Railways Association was held at Bournemouth on Thursday and Friday last. About 120 members, many of whom were accompanied by ladies, attended. The congress proved very successful in every way, and the arrangements which Mr. I. Bulfin (the general manager of Bournemouth Corporation tramways) had made to accord hospitality to the guests were much appreciated. The weather on Thursday was excellent, though the conditions on Friday were a little threatening. At 10 a.m. on Thursday the Mayor of the Borough held a reception at the Town Hall. The papers read at the congress (which were printed in full, with illustrations, in our issue of June 15) were followed with great interest, and gave rise to valuable discussions. Those presented on the first day included: "Bournemouth Corporation Tramways," by Mr. I. Bulfin, and "Notes on Railless ElectricTraction," by Mr. E. M. Munro. In connection with Mr. Bulfin's paper a very successful demonstration of the Sandberg "In-situ" rail-hardening process was given at the local tramway depot. Much interest was also manifested in the trial exhibition of one of the vehicles of Trackless Cars, Ltd., of Leeds, which was specially sent down to Bournemouth for the purpose. The design of the car, which is entirely novel, aroused much favourable comment.

Luncheon was served in the Town Hall at the invitation of the Mayor. In the afternoon many members joined in an excursion by motor omnibus to points of interest in and around Bournemouth. Tea was served at Tuckton Creaks at the invitation of Mrs. Bulfin. In the evening an informal dinner was held at the Norfolk Hotel.

The programme on Friday opened with the 25th ordinary general meeting of the Association, at which the Council's report for the year was presented. Subsequently a paper was read by Mr. C. J. Spencer on "Modern Improvements in Tramway Rolling Stock," and a long and interesting discussion followed.

The excursion planned for the afternoon was abandoned, and members devoted themselves to an inspection of the Corporation tramways power station and a demonstration of Trackless cars. The members' dinner was held in the evening, the guests including the Mayor and other members of Bournemouth Corporation.

SIX-WHEELED MOTOR VEHICLES.

The Ministry of Transport on Tuesday issued to all local authorities, etc., a copy of the Heavy Motor Car (Amendment) Order, 1922, given under the seal of the Minister on May 29. In a covering circular letter it is stated that the issue of a new general Heavy Motor Car Order will before long be necessary, but is being postponed pending legislation on the lines of the recommendations contained in the recently-published report of the Committee on Taxation and Regulation of Road Vehicles.

The present Amending Order has been made to meet the case of certain tractor and trailer combinations which have recently been placed upon the road. In these vehicles the trailer when in use has only two wheels in contact with the ground; and part of the weight of the load carried by the trailer is borne by the tractor which draws it. The Ministry, after inspection, is satisfied that these combinations are suitable for certain classes of transport. As, however, experience may lead to considerable alteration in design and construction, it has been decided for the present not to deal with them by separate regulations, but by amendment of the existing regulations with regard to heavy motors and trailers.

The general effect of the Amending Order is: (1) To increase the permitted axle-weight of a trailer from 4 to 6½ tons; (2) to prescribe a maximum limit of 22 tons for the sum of all the axle-weights of car and trailer; and (3) to permit a maximum speed of 12 m.p.h. for any heavy motor car fitted with resilient tyres when not drawing a trailer. The special tractor and trailer combinations will be permitted a maximum speed of 12 m.p.h., provided all the wheels are fitted with soft tyres, the total length does not exceed 33 ft., and the conditions as regards weight are complied with.

Safety Device on Gateshead Cars.—Gateshead and District Tramways Company are fitting to their new front-exit cars a useful device to protect alighting passengers from traffic approaching on the near side. It consists of an arm, bearing a "Danger" warning, which points out to the road when the front exit door is open.

ELECTRIC LOCOMOTIVES FOR PARIS-ORLEANS RAILWAY.

The Paris-Orléans Railway has recently placed an order for 80 electric locomotives with the Société Oerlikon and the Société de Construction des Batignolles, both in Paris. These locomotives are each for a 1-hour rating of 1,720 h.-p. The Société Oerlikon is to supply and erect the electrical equipment, while the Société de Construction des Batignolles deals with the mechanical part. Except in the case of the first five locomotives, which will be completed in Switzerland at the works of the Ateliers de Construction Oerlikon, and will serve as models, the whole electrical equipment will be built in France, to the Oerlikon design, at the works of the Société Oerlikon.

The locomotives are specially intended for goods trains and are to be capable of hauling a load up to 1,200 tons. They are, however, also to be suitable for passenger service, in which case a speed of about 68 miles per hour must be attainable. The locomotives are equipped with four motors wound for 1,500 volts D.C., and having each an output of 430 h.-p. measured at wheel rim.

The Ateliers de Construction Oerlikon are represented in this country by Messrs. Oerlikon, Ltd., of 34-35, Norfolk Street, Strand, London, whose general manager and chief engineer is Mr. G. Wuthrich, M.I.E.E.

MISCELLANEOUS NEWS AND NOTES.

Automatic Train Control.—The Ministry of Transport have issued a résumé of the report of the Automatic Train Control Committee, which was appointed in October, 1920.

"Keep to the Left" at Nottingham.—In connection with the "Keep-to-the-Left" rule which is to be adopted in Nottingham for pedestrians, the Watch Committee intend to stencil notices to this effect on the pavement.

New Dublin Service.—Dublin United Tramways Company have commenced a service between College Green and Blessington Street, via Capel Street and Bolton Street. The new facilities are much appreciated, especially by the legal fraternity attending the King's Inns.

Railless Cars for West Hartlepool.—West Hartlepool Town Council, after considering a report by the tramway's manager (Mr. T. G. Richardson), have decided to introduce railless electric traction on the Foggy Furze route, instead of relaying the tramway track.

L.C.C. Tramway Publicity.—In connection with the forthcoming lawn tennis tournament at Wimbledon, the London County Council tramways have issued another of their series of striking black-and-white posters. There is a three-minute service from the Victoria Embankment to Wimbledon Hill.

Glasgow Tramways Service.—Glasgow Corporation Tramways Committee have asked a special sub-committee to consider and report on the whole traffic organisation of the Tramways Department. The sub-committee are also requested to report on any alteration that might be effected for the improvement of the service.

London Underground Improvements.—It has been officially notified that the Bill to empower the London Electric and the City and South London Railway Companies to raise additional capital amounting to £3,500,000 will pass as an unopposed measure through the House of Commons. The money forms part of the £6,000,000 required for extension and improvements.

Blackpool Motorman's Presence of Mind.—When a Blackpool Corporation tramcar was proceeding along the promenade, an old man attempted to cross the track immediately in front of it. The motorman applied his emergency brake, but on realising that the car could not be pulled up in time to avoid the man, he leaned over the dashboard and pushed him on to the footpath.

Re-opening of Glasgow Subway.—The Glasgow Subway, which has been closed, and which the Corporation have decided to buy for £385,000, will be re-opened on Sunday, July 2. Parliamentary authority is to be sought to work the Subway as part of the tramway system. Meanwhile the Subway will be managed jointly by representatives of the Corporation and of the Subway Company. The entire equipment is being overhauled and the cars and station premises renovated.

Convention of Municipal Electricians.—The annual convention of the Incorporated Municipal Engineers' Association was held this week at Wolverhampton, Stoke-on-Trent and Birmingham. At Birmingham a paper on "Sub-station equipment, including automatic control," by Mr. R. A. Chattock (the city electrical engineer), was read. Subsequently tours of inspection were made of the various works of the General Electric Company and of the Nechells power station of Birmingham Corporation.

Judgment in Dundee Traffic Dispute.—Judgment was given by Lord Blackburn in the Scottish Court of Session on June 14 in the action brought by the Dundee, Broughty Ferry and District Tramway Company against the Corporation of Dundee for an interdict to prohibit them from conducting an omnibus service between Dundee and Broughty Ferry. His Lordship granted the interdict with expenses. Dundee Corporation inaugurated the service in November last. The company averred that as it was run at substantially lower fares than those charged on the joint tramway lines of the complainers and the respondents it was detrimental to the company's interests, and that the running of such a service was *ultra vires* of the respondents. The Corporation contended that the service was being run temporarily for the purpose of testing the amount of traffic.

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Glasgow's New Offer for Paisley Tramways.—Glasgow Town Council on Wednesday decided to offer £250,000 for the purchase of the undertaking of the Paisley and District Tramways Company. The Glasgow Tramways Committee had recommended that an offer of £200,000 be made, but in the Town Council, Bailie M'Whirr (the Tramway Convener), moved that a quarter of a million be offered, as any less sum, he said, would not be considered by the company.

Type of Cars for Edinburgh Gradients.—Mr. R. S. Pilcher (general manager of Edinburgh Corporation tramways) has prepared a report recommending the type of electric car most suitable for use on the northern routes of the city, where there are some comparatively steep gradients. Two of the declivities in question have gradients of 1 in 14 and one of 1 in 13. Mr. Pilcher has communicated with and visited a number of systems which are known to operate on steep gradients, and he states there is no reason why double-decked cars with top covers should not be used on gradients up to 1 in 9, so long as the cars are fitted with suitable slipper brakes. The gradients in Edinburgh, compared with other systems, are not nearly so difficult or so dangerous. He recommends, therefore, the use of top-covered, double-deck cars, fitted with slipper brakes for use on the northern routes.

Light Railways Report.—The report of the proceedings of the Ministry of Transport and the Light Railway Commissioners under the Light Railways Acts, 1896 and 1912, was presented to Parliament on Tuesday. It states that the powers of the Light Railway Commissioners were transferred to the Ministry as from August 19, 1921. The Commissioners remained in office for six months after that date to deal with applications then before them, and ceased to hold office on February 19, 1922. During the year the Minister confirmed the following orders made by the Light Railway Commissioners, after making such amendments as were deemed necessary:—Llantrisant; Cambrian Railways (Tanat Valley Light Railway Transfer); London and North-Western Railway (Wolverhampton and Cannock Chase Light Railway); Dearne District; Lee-on-the-Solent; Totton Hythe and Fawley. The report includes lists of the applications made and tabular statements of the orders granted, etc.

Future of Croydon Tramways.—The future of Croydon Corporation Tramways, which were recently the subject of a specially-prepared report by outside consultants, is the subject of much local discussion, and many ward meetings of ratepayers have considered the matter. Councillor A. A. Thomson (chairman of the Tramways Committee) addressed a meeting at Addiscombe, and said the idea of "scrapping" the system must be entirely dismissed. He was totally opposed to handing the service over to the London County Council. As to omnibuses, the L.C.C. had failed to get powers, so the chances of Croydon doing so were very slender. There was no reason why they should not run their own tramways as efficiently as the L.C.C. could. The past year's working had been very satisfactory. The meeting approved the action of the Council in directing the Tramways Committee to prepare estimates for re-laying the track and to open negotiations with the L.C.C. for through-running on reciprocal terms.

Sir William Acworth and Road Maintenance Costs.—Sir William M. Acworth (chairman of the London United Tramways), in a letter to the *Times* on the question of the railways and motor transport competition, makes a noteworthy point. He takes the total cost of carrying a ton of merchandise per mile, by motor lorry, as 10d., and states that the corresponding railway charge, including collection and delivery, for the class of goods for which motors compete, would be 5d. per mile, or half of the cost by motor lorry. Sir William points out that the motor running costs include a licence duty representing roughly 1d. per mile run. "It is probably safe to say that the damage done to the road by a motor weighing, with its load, 6½ or 7 tons, is not less than 1s. per mile. In other words, the real cost of conveying a ton of net load is not 10d. but 14d. But of the 1s. a mile for the use of the road, the motor owner pays 1d. and the ratepayer pays the remaining 11d. . . . It is questionable whether the ratepayer will be content to go on paying the eleven-twelfths of the road maintenance cost for him."

Sheffield Tramways' Enterprise.—Under the title of "Pleasure Trips and Rambles in the Sheffield District," the Corporation Tramways and Motors Department have issued an excellent booklet as an introduction to the facilities which the undertaking offers. Enclosed in a striking and artistic cover (5 ins. by 7 ins.) are 100 pages containing an attractively written description of the many beauty spots which, the stranger may be surprised to learn, are to be found within easy reach of the city. The reader of the booklet is told in charming fashion where to go, what to see, which car or omnibus to board, and is presented with many photographic reproductions of picturesque and historical landmarks, including Chatsworth and Haddon Hall. Corporation omnibus routes have, in fact, been so well developed that wide expanses of the countryside and moor are now easily accessible to the city population. Local firms have patronised the advertisement pages of the booklet very well, and the production as a whole is a distinct credit to Mr. A. R. Fearnley (the general manager) and his staff.

Helsby Condensers.—The British Insulated and Helsby Cables, Ltd., of Prescot, Lancs., have issued a pamphlet (No. H.98) dealing with their "Helsby" condensers for the improvement of power factor. The publication describes the use and method of installation of these oil-immersed condensers, and gives various statistics which are likely to be of value in connection with their operation.

FINANCIAL.

Lowestoft Corporation Tramways.—There was a decrease in income of £2,180 on the year's working, but expenses were less by £3,652, leaving a deficiency of £2,158.

Yarmouth Corporation Tramways.—The accounts for the past year show a loss, after payment of interest and sinking fund, of £7,373. During the summer months, penny stages are to be eliminated.

Warrington Corporation Tramways.—The total income for the year ended March 31 last was £52,854, against £53,245 in the preceding year. Expenditure totalled £45,859, as compared with £46,302, and the net profit fell from £1,455 in the previous year to £173.

Aberdeen Corporation Tramways.—The total revenue from the tramways for the year ended May 31 last was £184,502, a decrease of £6,968 as compared with the previous year. On the working of the motor omnibuses there was an increase in receipts of £7,775, as compared with the preceding year, the total being £11,617. The aggregate receipts, £196,119, constitute a record for the undertaking.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended June 21 amounted to £95,370, a decrease of £8,519 compared with the corresponding period last year. The route length was 160.73 miles, as compared with 152.52 a year ago. From April 1 (the commencement of the financial year) to June 21 (11½ weeks), the total receipts were £1,123,308, a decrease of £87,648 on the corresponding period of 1921.

William Griffiths & Co., Ltd.—The directors of William Griffiths and Co., the well-known tramway and road contractors, of Hamilton House, Bishopsgate, E.C., have declared an interim dividend at the rate of 15 per cent. for the half year to April 30. This dividend shows the continued prosperity of the firm, which in 1920 also paid 15 per cent., and in 1921 the same amount, carrying forward in the former case £12,963, and in the latter £21,255.

Tramway Traffic Receipts.—Official returns of 34 of the principal tramway undertakings in the United Kingdom for the week ended June 10, which included Whit-Monday, give total receipts of £397,383 or £20,999 more than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £203 19s. 10d. per mile of single track, and last year at the rate of £193 4s. 3d., thus showing an increase for the week of £10 15s. 7d. per mile open.

British Electric Traction Company.—The annual meeting was held on June 16, in London, Mr. J. S. Austen (the Chairman) presiding. Mr. Austen, referring to the tramways side of the company's business, said during the current year there was a falling-off in receipts up to date of about 20 per cent., which was naturally a serious amount. There was, however, a very considerable saving in expenses. Alluding to the company's omnibus interests, Mr. Austen said these were still capable of expansion, and were likely to increase.

Exeter Corporation Tramways.—The annual report for the year ended March 31 last, presented to the Tramways Committee by Mr. R. Oswald Baldwin (the general manager), reveals a notable improvement in the position of the undertaking. The total revenue was £36,841, and the working expenses £29,963, leaving a gross surplus of £6,878. Interest, sinking fund and income tax charges amounted to £5,318, so that the net profit was £1,560. The District Rate made a contribution of £2,000 which, with the net surplus mentioned, has been carried forward to the Reserve and Renewals Fund account. Total traffic receipts at £36,109 established a record for the system, and represented an increase of £74 on the previous year's running. Passengers carried numbered 5,506,900, or a decrease as compared with the preceding year of 204,083. The car mileage was 434,658—an increase of 1,641.

Bradford Corporation Tramways.—There was a balance of £56,617 on the past year's working of Bradford Corporation tramways. The receipts amounted to £721,547; working expenses, including running and maintenance, and excluding the special renewals at £150,000, came to £588,803; income tax, interest, and sinking fund to £76,127, making a total of £664,930. In announcing the figures Alderman E. Priestley (chairman of the committee) said they were fairly well satisfied with the year's working. The deficit of £16,000 with which the year opened had been wiped out, and there was the balance already mentioned on the revenue account. It was hoped that at the end of the current year an even more satisfactory financial statement would be forthcoming, for the receipts up to the present were £1,000 more than they were at the corresponding date last year. It was proposed to transfer the balance to the renewals fund.

BUSINESS NOTES.

The Overseas Employment Branch of the Ministry of Labour was recently transferred from the Hotel Windsor, Victoria Street, S.W.1, to Nos. 5 and 6, Clements Inn, Strand, W.C.2.

"Titan" Manganese Steel Trackwork for tramway points and crossings, which has been adopted on most of the important systems throughout the country and on many abroad, is illustrated in a neat booklet issued by the Titan Trackwork Co., of Rutland Road, Sheffield. Complicated layouts on the Manchester, Leeds, Sheffield and other undertakings are illustrated, and attention is also directed to the firm's patent heel adjuster (pinless), which automatically takes up any wear between tongue and point.

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GLASGOW CORPORATION TRAMWAYS.

In our issue of June 17, some traffic and other statistics of the Glasgow Corporation Tramways for the year ended May 31, were given. The following is a summary of the accounts for that year compared with the three previous years :—

Year ended May 31.	1922.	1921.	1920.	1919.
	£	£	£	£
Traffic receipts	2,347,219	2,388,444	1,716,491	1,527,488
Sundry receipts	3,534	4,410	5,087	3,832
Total revenue	2,350,753	2,392,854	1,721,578	1,531,320
Traffic expenses	1,007,318	1,018,501	856,111	674,604
General expenses	218,820	254,573	225,872	174,508
Maintenance and repairs ..	413,521	462,000	317,521	219,509
Power expenses	162,761	199,517	152,742	106,686
Clydebank bridges	2,232	2,475	2,314	1,753
	1,804,652	1,937,066	1,554,560	1,177,120
European War	—	599	3,601	72,869
Total expenditure ..	1,804,652	1,937,665	1,558,161	1,249,989
To net revenue account ..	546,101	455,189	163,417	281,331
Interests on investments ..	3,541	15,240	13,345	10,565
Total	549,642	470,429	176,762	291,896
APPROPRIATIONS—				
Rent of Paisley lines ..	15,635	15,722	11,093	9,755
Interest on capital ..	11,304	6,926	3,892	—
Sinking fund	4,527	2,674	1,715	—
Income-tax..	55,534	70,813	81,295	83,702
Parliamentary expenses	568	811	1,056	124
Renewal and depreciation	309,350	267,687	186,242	183,543
Total	396,918	364,633	285,293	277,124
Balance*	152,724	105,796	—	14,772
Deficit	—	—	108,531	—

* From which there falls to be deducted the balance of the deficit of 1919-20 amounting to £2,735 3s. 8d., leaving an available surplus for the Common Good amounting to £149,988.

CONTRACTS.

Messrs. M'Hardy & Elliot, coach-builders, Low London Road, Edinburgh, have received an order from Salford Corporation Tramways for 12 tramway car top covers.

Keighley Town Council have decided to purchase the two motor omnibuses at present on hire from Leyland Motors, Ltd., at £1,575 (net) each ; also, to buy an electric arc welding plant at an estimated cost of £316, for use on the tramway track.

New Electrics for Sheffield.—Sheffield Corporation Health Committee have purchased five electric vehicles from the General Vehicle Co., and one from Clayton Wagons, Ltd., but are of opinion that it is not desirable in these particular cases to disclose the contract prices.

Burnley Tramways Committee recommend the purchase of 3 miles o o o round copper trolley wire at 10½d. per lb., less 2½ per cent., from F. Smith & Co. Ltd. (Salford) ; 12 gear wheels at £11 15s. 9d. each, and 12 pinions at 18s. each, from A. Wiseman, Ltd. (Birmingham) ; and 1,500 Wrendal lamps at 1s. 3d. each, from L. Andrew & Co., Ltd. (Manchester).

METAL PRICES.

Supplied by the British Insulated and Helsby Cables, Ltd.			Price on June 22, 1922.	Price on June 15, 1922.
COPPER.	Best Selected	per ton	£66	£66
	Electro Wirebars ..	per ton	£70 10s.	£70
	H.C. Wire, basis ..	per lb.	10½d.	10⅝d.
	Sheet	per lb.	10½d.	10½d.
PHOSPHOR BRONZE WIRE (Telephone)		per lb.	1s. 2½d.	1s. 2⅝d.
BRASS 60/40	Rod, basis	per lb.	7d.	7d.
	Sheet "	per lb.	9½d.	9½d.
	Wire "	per lb.	9½d.	9½d.
PIG IRON.	Cleveland Warrants ..	per ton	£4 15s.	£4 15s.
	Galvanised Stee. Wire, 8 S.W.G.	per ton	£18	£18
LEAD PIG.	English	per ton	£26	£26
	Foreign or Colonial ..	per ton	£24 15s.	£24 10s.
TIN.	Ingot	per ton	£152 10s.	£150 12s. 6d.
	Wire, basis	per lb.	2s. 1d.	2s. ⅜d.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
Queen's House, Kingsway, London, W.C.2.

TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	LATEST RETURN. 1921.	1922.	+ or —	AGGREGATE. Wks.	1921-22.	+ or —
Aberdeen Corporation	June 14	3,656	3,763	+ 107	2½	7,690	+ 1,281
" Motor Buses	" 14	213	245	+ 32	2½	492	— 355
Ayr Corporation ..	" 17	692	689	— 3	5	3,238	— 26
Barrow Corporation ..	" 17	821	645	— 176	11	6,941	— 2,859
Belfast City	" 16	11,619	11,899	+ 280	11	130,799	— 12,219
Birkenhead Corporation	" 18	2,452	2,307	— 145	11½	28,526	+ 450
" Motor Buses	" 18	800	761	— 39	11½	8,443	+ 611
Birmingham Corporat'n	" 10	29,334	29,967	+ 633	10	293,951	— 12,855
" Motor Buses	" 10	2,286	2,528	+ 242	10	19,554	— 3,151
Blackburn Corporation	" 14	2,159	2,553	+ 394	11½	29,407	+ 6,157
Bradford Corporation	" 17	11,458	14,827	+ 3,369	12	162,294	+ 16,253
Burnley Corporation ..	" 17	2,654	3,206	+ 552	..	..	..
Burton-on-Trent Corp.	" 18	664	547	— 117	11	6,287	— 682
Bury Corporation ..	" 18	2,380	2,586	+ 206	11½	28,958	+ 1,596
Chatham & District ..	" 8	1,562	2,209	+ 647	23	36,186	— 1,120
Chesterfield Corporatn.	" 12	1,269	1,285	+ 16	10	13,292	— 1,001
Derby Corporation ..	" 17	1,644	2,125	+ 481	11	24,363	+ 1,703
Dundee City	" 14	3,438	3,230	— 208	4½	13,590	— 1,297
East Ham Corporation	" 17	2,094	2,108	+ 14	11½	24,462	+ 927
Edinburgh Corp. Trys.	" 10	13,200	17,431	+ 4,231	4	50,691	— 2,630
" Motor Buses	" 10	4,335	3,972	— 363	4	15,166	— 1,960
Glasgow Corporation ..	" 17	49,389	45,563	— 3,826	2½	114,024	— 7,837
Glossop (U.E. Sup. Co.)	" 17	213	222	+ 9	24	5,476	— 140
Halifax Corporation ..	" 13	3,609	4,578	+ 969	10½	48,087	+ 4,601
" Motor Buses ..	" 13	97	71	— 26	10½	680	— 462
" Railless Cars ..	" 13	..	54	..	10½	646	...
Huddersfield Corp. ..	" 17	5,535	5,316	— 219	12	65,613	— 1,112
Ilford U.D. Council ..	" 17	1,605	1,480	— 125	11½	17,083	— 236
Ipswich Corporation ..	" 17	781	808	+ 27	11	9,360	+ 597
Isle of Thanet	" 14	1,365	1,305	— 60	36½	26,119	+ 1,329
Kilmarnock Corporatn.	" 17	363	327	— 36	4½	1,580	— 243
Leicester Corporation..	" 17	6,181	7,344	+ 1,163	24	176,791	+ 34,288
Liverpool Corporation	" 17	28,886	29,740	+ 854	24	702,265	+ 39,904
London County Council	" 21	103,889	95,370	— 8,510	11½	1,123,308	— 87,648
Maidstone Corporation	" 15	430	452	+ 22	10½	5,469	+ 208
Manchester Corporation	" 17	39,548	35,260	— 4,288	11	409,099	— 36,629
Newcastle-on-T. Corp.	" 10	10,886	10,879	— 7	10	102,314	— 7,206
Nottingham Corp. ..	" 15	5,339	7,506	+ 2,167	11	85,080	+ 26,582
Oldham Corporation ..	" 18	4,597	4,582	— 15	12	57,472	— 1,403
Preston Corporation ..	" 14	1,803	1,761	— 42	10½	19,690	— 924
" Motor Buses ..	" 14	..	121	..	10½	1,396	..
Reading Corporation ..	" 15	1,620	1,580	— 40	11	17,286	+ 732
" Motor Buses ..	" 15	346	346	Nil.	11	3,825	+ 56
Rotherham Corporation	" 19	1,993	2,000	+ 7	11	23,914	+ 1,142
Salford Corporation ..	" 11	10,808	13,170	+ 2,362	10½	111,505	— 3,942
Sheffield Corporation ..	" 18	19,707	17,925	— 1,782	11½	209,008	— 9,362
Southampton Corp. ..	" 14	2,411	3,224	+ 813	11	34,095	+ 6,344
" Motor Buses	" 14	374	97	— 277	11	1,075	— 2,186
Southend-on-Sea Corp.	" 14	2,253	2,806	+ 553	11	26,629	+ 7,002
South Shields Corp. ..	" 10	1,584	2,231	+ 647	10	17,733	+ 2,119
St. Helens Corporation	" 13	1,804	1,719	— 85	11	17,416	— 1,569
Sunderland Corporation	" 18	2,638	2,489	— 149	11	28,816	+ 1,227
Swindon Corporation ..	" 14	389	368	— 21	10½	3,978	— 332
Tyneside Trys., Trds...	" 7	1,275	1,123	— 152	23	19,129	— 8,583
Wallasey Corp. ..	" 17	2,657	2,670	+ 13	11½	29,749	— 789
" Motor Buses ..	" 17	212	266	+ 54	11½	2,764	+ 60
Walsall Corporation ..	" 17	1,618	1,443	— 175	11	18,192	— 540
" Motor Buses ..	" 17	831	652	— 179	11	10,084	— 40
Walthamstow U.D.C...	" 17	2,398	1,985	— 413	11½	22,567	— 2,242
Warrington Corp. ..	" 15	848	932	+ 84	11	10,717	+ 278
West Ham Corp. ..	" 15	5.745	5,497	— 248	10½	63,496	+ 391
Wolverhampton Corp.	" 21	2,170	1,903	— 267	12	26,228	— 1,023
" Motor Buses	" 21	592	587	— 5	12	7,901	+ 434

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	LATEST RETURN. 1921.	1922.	Wks.	AGGREGATE. 1921-22.	In. or Dec.
Anglo-Argentine ..	June 17	£75,607	76,951	24	£2,012,550	+ 80,297
Ballarat & Ben. (4 wks.)	April 23	5,121	5,473	4	5,473	+ 352
Brazilian Traction (Mrs)	April	13,562,000	15,413,000	17	60,156,000	+ 8,676,000
Brisbane	April	47,750	48,700	17	192,590	+ 9,055
British Columbia $	April	835,793	818,177	43	8,589,842	+ 122,528
Buenos Aires Lacroze ..	May	58,492	59,278	48	638,716	+ 9,272
Burmah Tr. & Lght. Rs.	May	48,353	65,357	43	587,411	+ 80,800
Calcutta .. Rs.	June 17	84,271	107,672	24	2,551,543	+ 805,620
Cape Town	May	27,407	28,006	..	..	..
Carthagena & Herrerias	May	1,602	2,793	21	13,777	+ 904
Cordoba	Mar.	21,717	25,382	52	277,368	+ 39,922
East India	May	4,392	3,960	43	41,042	— 1,337
Kalgoorlie ..	Mar.	2,485	2,390	13	6,601	+ 1,652
La Plata ..	Mar.	* 3,403	7,067	13	20,109	+ 9,471
Madras (2 weeks) Rs.	June 15	* 47,759	47,439	23	540,679	+ 146,625
Manila .. .. $	April	279,534	286,044	17	1,189,893	— 15,816
Montevideo	May	46,579	48,074	30	327,493	— 5,963
Para	May	22,705	23,651	26	136,158	— 54
Pernambuco	June 18	3,165	3,112	24½	84,396	— 16,935
Port Elizabeth	May	6,304	6,713	..	..	..
Rangoon .. Rs.	May	138,950	145,450	21	703,758	+ 38,248
Shanghai .. $	April	157,500	184,500	17	720,217	+ 94,478
Singapore .. $	May 27	11,519	10,962	21	296,984	+ 39,831
Winnipeg .. $	April	462,378	435,058	17	1,871,392	— 52,548

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

COMMON FUND COMPANIES.		
Metropolitan District Rly. Co. ..	Week ending June 17, 1922 ..	£236,193
London Electric Rly. Co.	Corresponding week last year ..	251,810
City & South London Rly. Co. ..	Decrease	15,617
Central London Rly. Co.	Aggregate from Jan. 1 to date ..	5,357,542
London General Omnibus Co., Ltd.	Corresponding period last year ..	5,665,505
	Decrease	307,963
LONDON & SUBURBAN TRACTION GROUP	Week ending June 17, 1922 ..	£52,460
Metropolitan Elec. Tramways, Ltd.	Corresponding week last year ..	60,886
London United Tramways, Ltd.	Decrease	8,426
South Met. Elec. Tr. & Ltg. Co., Ltd.	Aggregate from Jan. 1 to date ..	1,170,624
Tramways (M.E.T.) Omnibus Co., Ltd	Corresponding period last year ..	1,273,814
	Decrease	103,190

	Passenger.	Goods.	Total.
METROPOLITAN RAILWAY			
Week ending June 17, 1922 ...	£33,330	£3,338	£36,668
Total Receipts (24 weeks) ...	790,865	88,281	879,146
MERSEY RAILWAY			
Week ending June 17, 1922 ...	—	—	£3,968
Total Receipts (24 weeks) ...	—	—	108,934

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Tramway AND Railway World
FOUNDED IN 1892.

OFFICES:—AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.2

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THE ANNUAL SUBSCRIPTION INCLUDES 64 ISSUES, OF WHICH 12 ARE ILLUSTRATED NUMBERS.

LONDON, JULY 1, 1922.

LEFT HAND RULE OF THE FOOTPATH.

To-day, July 1, a concerted effort is to be made in London to inaugurate a general rule of the footpath to "Keep to the left" instead of to the right. The London Safety First Council, which has advocated this alteration since the beginning of 1917, has invited all the local authorities in the Greater London area to participate in this campaign, for it will be readily understood that uniformity is essential in a change of this nature. That the response of these bodies will be favourable is to be expected from the fact that the London County Council, twenty-four out of the twenty-eight Metropolitan Boroughs, and thirty-one of the other local authorities round about have previously passed resolutions in support of such a rule. While London has been singled out to give the lead to-day, the "Keep to the left" movement is not, of course, by any means confined to the capital. A constantly increasing number of provincial municipalities are putting the change into operation, and resolutions in its favour have been passed by the whole of the national bodies representing local government authorities, including the County Councils' Association, the Association of Municipal Corporations, the Urban District Councils' Association, and the Rural District Councils' Association. Although there is no law by which the new rule can be enforced, it is noteworthy that the Ministry of Transport view it with favour and that the Metropolitan Police, while unable to take any definite action, have adopted an attitude which may be summed up as one of "benevolent neutrality." The left-hand rule has certainly much to recommend it; on the other hand, it is hardly possible to find one sound argument to justify a continuance of the older "regulation." Supporters of the new departure attach much importance to the fact that by walking on the left-hand side of the footwalk, pedestrians would be facing on-coming traffic, whereas at present they are liable to be run down from behind should they happen to step off the kerb. The risks which continually beset intending tramcar passengers when hastening from the pavement to board a passing car are, of course, keenly felt by tramway managers and operating staffs. Though the proposed change can hardly be expected to eliminate this danger, it may serve to reduce it, and the altered rule should certainly act as a warning to the more absent-minded. At the present time there is a tendency either to overlook or disregard completely any rule of the footpath whatever, so that the publicity which is being given to the new arrangement is likely to have the salutary effect of rendering the sidewalks a little more orderly, to the general good. Among the expedients which have been adopted by various municipalities to effect the change are the exhibition of notices in tramcars and omnibuses, as well as on tramway and lighting standards. It may therefore be expected that tramway committees will from time to time be called upon to give their help in encouraging the observance of the new rule, and we believe that a little reflection will convince them it is desirable that they should do all they can to aid the movement.

ELECTRIC LOCOMOTIVES FOR JAPAN.

LARGE CONTRACT PLACED WITH THE ENGLISH ELECTRIC CO.

The Imperial Government Railways of Japan have just placed with the English Electric Company for their Dick Kerr Works at Preston an order for 34 complete electric locomotives of the total value of upwards of £500,000. This represents the whole requirement of locomotives up to the end of 1923 for those sections of their main line railways which the Japanese Government have decided to electrify at once. The order was obtained in the face of keen foreign competition, particularly from America, and was placed with the English Electric Company after the fullest investigation by Japanese engineers into the systems in operation in different parts of the world, owing to their confidence in the excellence of British design and workmanship.

Eight of the locomotives now ordered are for heavy express passenger service. They are of the 2-C-C-2 type. Their weight is approximately 96 tons and they are designed to haul a 415-ton train at a balancing speed of about 60 miles per hour. Each locomotive is equipped with 6 D.K. 86A motors rated at 306 h.p. at 500 volts, the motors being connected in 2 groups of 3 in permanent series on a trolley voltage of 1,500 volts. The control equipment is of the standard English Electric cam-shaft multiple unit type.

Of the remaining locomotives, 9 are for local passenger service and 17 are for heavy freight service. These 26 are all of the B-B. type and will weigh approximately 56 tons each. They are equipped with 4 D.K. 86A motors similar to those on the express passenger locomotives, but in this case the motors will be connected in two pairs in permanent series. Here, too, the control is the standard English Electric multiple unit type. The locomotives for local passenger service are designed to haul a 315-ton train and the freight locomotive a 600-ton train, the balancing speeds being about 55 and 40 miles per hour respectively.

TRAMWAY WAGES: SLIDING SCALE AGREEMENT.

The following communication, signed by Messrs. J. Beckett and A. de Turckheim, joint secretaries of the employers' side of the National Joint Industrial Council for the tramway industry, was issued on June 21, giving three months' notice to terminate the existing agreement in regard to tramwaymen's wages:—

SLIDING SCALE AGREEMENT: JUNE, 1921.

"We beg to inform you that the representatives of both sections of the employers upon the National Council have been giving consideration to the existing relation of tramway wages to similar classes of labour and to skilled, semi-skilled and unskilled labour in other industries, and as a result they have come to the conclusion that the existing position is such that full re-consideration is required of the whole question by the National Council.

"We are therefore directed to tender to you three months' notice to terminate the Agreement entered into on June 16, 1921.

"Will you, as the acting secretary of the National Council for the time being, be good enough to place the mattter on the agenda for the next meeting, to be held on July 13, 1922?—Yours faithfully, J. Beckett, A. de Turckheim, Joint Secretaries for the Employers' Side."

In acknowledging the receipt of the notice, Mr. John Cliff, acting secretary of the employees' side of the National Joint Industrial Council, says that the question of the operation of the notice involves an important point of procedure. It appears to him that as the agreement referred to was made by the National Council, a notice to terminate the agreement must be formally received by the National Council when in session and can only be operative from the date of the meeting when such notice is formally received. The decision of the Council on the matter will be taken at their next meeting on July 13.

Discount Tickets at Hull.—Hull Corporation Tramways Committee has resolved to issue discount tickets at the following rates:—14 three-halfpenny tickets for 1s. 6d., and 14 two-penny tickets for 2s.

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THE LONDON COUNTY COUNCIL TRAMWAYS.

Report for Year 1921-22 and Estimates.

The tramway accounts of the London County Council for the year ended March 31, 1922, as prepared by the Comptroller of the Council, together with a memorandum by the General Manager on the working of the undertaking, was submitted to the Council by the Highways Committee on Tuesday. The result of the year's working is a balance deficiency of £88,757, after payment of all charges, including interest and sinking fund. A summary of the results is appended :—

The tramways owned or worked by the Council extend over a total route length of 158·63 miles, comprising 122·5 miles on the conduit system and 36·13 miles of overhead line. The latter include 8·82 miles of the Leyton tramways, which have been worked by the Council since July 1, 1921. The whole of the system is worked by the Council with the exception of 2·79 miles (overhead) in Harrow Road, which are worked by the Metropolitan Electric Tramways, Ltd.

The total income from the undertaking and the working expenses for 1921-22, as compared with the previous year, are as follows :—

	1921-22.	1920-21.
Total revenue	£5,160,320	£4,904,427
Working expenses	£4,386,891	£4,623,654
Surplus on working	£773,429	£280,773
Percentage of surplus to receipts	(15·0)	(5·7)
Proportion of renewals charged to revenue account (net)	£202,848	£215,639
Surplus on revenue account	£570,581	£65,134
Percentage of surplus to receipts	(11·1)	(1·3)
Total number of passengers carried	688,151,316	689,452,036
Total number of car miles run	59,532,087	57,488,232

Against this surplus of £570,581 on revenue account there are the following charges :—

Interest	£293,964
Redemption	353,636
	£647,600
Interest on overdrawn cash balance, etc. (£20,382); Income-tax (£85,698); Parliamentary expenses, etc. (£1,321); amount due to Leyton U.D.C. under agreement for working of their lines by the Council (£3,599)	£758,600
Less—Tax deducted and retained from interest on debt (£86,255); rent of surplus properties (£5,360); debt charges, etc., recovered from other tramway authorities (£7,648)	99,263
	£659,337
Deficiency for year	£88,757

OPERATING STATISTICS.

The following table gives particulars of the average length of track open, passenger receipts and working expenses per car mile, the total number of passengers carried, and the gross passenger traffic receipts for the ten years ended March 31, 1922 :—

Year ended March 31.	Route Length Miles.	Average Working Expenses per Car-mile.*	Average Passenger Receipts per Car-mile.	Total Number of Passengers Carried.	Gross Passenger Traffic Receipts.
		d.	d.		£
1913	132·49	6·62	9·73	501,102,149	2,143,559
1914	136·62	6·50	8·94	516,338,859	2,181,344
1915	140·66	6·89	9·50	547,253,332	2,323,130
1916	141·52	8·44	11·42	545,247,747	2,278,115
1917	141·67	8·82	12·01	586,127,976	2,476,309
1918	141·67	10·38	13·97	593,516,141	2,862,554
1919	141·67	14·27	17·33	636,157,361	3,469,165
1920	141·70	16·62	18·82	685,124,156	4,168,512
1921	143·57	19·30	19·91	689,452,036	4,769,477
1922	155·83	17·68	20·39	688,151,316	5,058,065

* Excluding cost of renewals, etc.

CAPITAL EXPENDITURE AND REPAYMENT.

Capital expenditure on the undertaking up to March 31, 1922, amounted to £15,283,020 7s. 6d., of which £807,569 13s. 1d. represents expenditure during the year 1921-22, including £193,609 11s.5d. for half the net cost of renewals of track.

The amount of the debt incurred up to March 31, 1922, was £15,616,068 16s. 10d. The net balance on March 31, 1922 (*i.e.*, the debt outstanding, after allowing for debt repaid, sinking fund balances, and for £130,794 in respect of the value of surplus land) was £8,772,226 18s. 5d. The total amount of debt repaid up to March 31, 1922, was £6,153,068 12s., to which must be added £559,979 6s. 5d. from proceeds of sales, gain on cancellation of stock, and interest on accumulations of sinking fund, making in all £6,713,047 18s. 5d.

The amount of capital expenditure which, up to March 31, 1922, had become obsolete owing to the electrification of the horse tramways, was £2,024,687 15s. 3d. The debt in respect of this expenditure has been reduced by the ordinary process of repayment and by proceeds of sales to £813,078 4s. 3d. Certain other expenditure, amounting to £181,397 0s. 4d. incurred in connection with electric traction, has also been rendered obsolete. The repayment of this is being provided for over short term periods specially approved by H.M. Treasury, and the balance (£9,690 12s. 4d.) will be cleared off during the year 1922-23.

RATES, PAVING AND STREET WIDENINGS.

The total sum paid to Metropolitan borough councils and the City Corporation as rates on the permanent way amounted in the year 1921-22 to £79,871 3s. 9d., and represents an average relief to the rates of London levied by the road authorities of nearly ·39d. in the £. This is in addition to rates and taxes paid by the Council in respect of tramway offices, car sheds, sub-stations, depots, etc. The saving to the road authorities in consequence of the obligation of the Council to maintain the paving along the tramway routes was estimated by the Council's officers at the end of the year under review to be about £271,000 a year on the present mileage, this estimate being based, of course, on the normal standard of maintenance.

The aggregate amount ultimately chargeable to the tramways account in respect of the estimated cost of effecting street improvements carried out along tramway routes, under resolutions already passed by the Council, is approximately £800,068, of which £730,448 had already been so charged up to March 31, 1922. In addition, the amount estimated to have been paid to tramway companies (as part of the purchase money for their undertakings) in respect of the expenditure incurred by them on street improvements is £40,576, and the whole of this amount has been charged to the tramways account.

The amount actually charged to the tramways revenue account during the year 1921-22 in respect of rates on tracks (£79,871 3s. 9d.) and debt charges on street improvements (£28,518 14s. 6d.), together with the sum estimated at the end of the year to be saved to local authorities on maintenance of paving (at the rate of £271,000 a year), gives a total of approximately £379,000, and various rates were therefore relieved to this extent.

RENEWALS AND STORES.

In the accounts for the year 1921-22 the cost of renewals of track has been charged equally to capital and maintenance accounts, the Treasury having sanctioned the continuation during that year of the arrangement adopted as an emergency measure during the two preceding years. It is estimated that in the current financial year the tramways revenue will be sufficient to defray the whole cost of all renewals. The stock of stores appears in the balance sheet at £525,059, as compared with £732,716 at the end of the previous year. The Finance Committee in their report remark that they have for some time been in communication with the Highways Committee with regard to the very large sum of money locked up in stores, and they look for further reductions in stock in the near future.

ESTIMATES FOR 1922-23.

The annual tramway estimates for the year 1922-23, submitted by the Finance Committee, show that the gross capital requirements for the year will amount to £1,274,090, but this figure has been written down to £1,060,000 as representing the maximum amount likely to be expended in the year. Of this sum £235,000 covers the purchase of the Hammersmith lines of the London United Tramways, Ltd. The balance includes the installation of new plant at Greenwich power station and certain sub-stations, the provision of new cars, work at the central car repair depot and stores.

The Committee reported that the estimates indicate that the undertaking is likely to prove more successful financially than during the past three years. The arrangement agreed to by the Treasury to charge one half of the cost of track renewals to capital account no longer obtains, and the whole cost of renewals in 1922-23 (£360,100) would be charged to revenue. Accordingly an additional £177,000 will be borne this year by the revenue account in respect of renewals. After allowing for this charge, it is estimated that there will be a net surplus of £38,337, as against an actual deficiency of £88,757 for the past year. The realisation of the estimate, the Committee added, is dependent in a large measure upon obtaining the anticipated traffic receipts, which have been calculated at 20d. for each of the 61,100,000 car miles expected to be run.

The Highways Committee estimate that the working expenses, excluding special charges, but including cost of renewals, will amount to 17·22d. a car mile, and the Committee anticipate the results for the year 1922-23 will be as follows :—

	£
Total receipts (including advertisement rents, etc.)	5,214,665
Total working expenses, including cost of renewals	4,410,595
Estimated surplus on revenue account	804,070
Deduct—	
Proportion of surplus payable to Leyton Urban District Council	15,890
Debt charges (£389,694 for repayment of capital and £336,215 for interest on capital expenditure)	725,909
Income-tax (less tax deducted and retained from interest paid), net expenditure on surplus property and sundry items	23,934
	765,733
Estimated net surplus	38,337

The estimated passenger receipts were prepared in the light of experience gained since reduced fares have been in operation. The results actually obtained show that, although the change in fares was followed by an increase in the number of passengers carried, there has been a falling off in revenue from fares above 1d., and this is attributed to a large extent to trade depression and unemployment.

New Middlesex Light Railway Proposed.—An inquiry is to be conducted by the Ministry of Transport at Uxbridge, Middlesex, on July 14, into the application of the Local Development and Light Railway Co., Ltd., of 9, Victoria Street, S.W.1, for powers to construct what is to be known as the Harefield Light Railway. This will run from Harefield to Uxbridge, a distance of nearly five miles, and will have a junction line with the Great Western and Great Central Joint Railway at Denham. The motive power may be "steam or other mechanical power, excluding electricity," and the gauge will be 4 ft. 8½ ins. Sir Alexander Gibb and Partners are the engineers, while the Parliamentary Agents are Baxter and Co., of 21, Victoria Street, S.W. Harefield is a small rural town which is becoming the centre of industrial developments.

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MISCELLANEOUS NEWS AND NOTES.

Depot Extensions at Exeter.—Exeter Tramways Committee are to recommend extensions to the car depot estimated to cost £2,350.

Tramway Strike at Vienna.—The employees of the Vienna electric tramways struck work on Tuesday, as their demands had been rejected by the municipality.

Gloucester and Brockworth Light Railways.—The Minister of Transport has recently made the County of Gloucester (Gloucester and Brockworth) Light Railways (Revival of Powers) Order, 1922, reviving the powers granted by the Order of 1903, and extending the period for completion.

Brighton Aquarium as Garage.—The Aquarium on Brighton Promenade is to be leased by the Corporation to a firm of motor coach proprietors for use as a garage, with ornamental roof, for a term of 60 years at a rental of £2,870. The company undertake to spend £40,000 on the building.

Bradford Railless Routes.—The Unopposed Bills Committee of the House of Commons on Wednesday passed for third reading the Bill to confirm a Provisional Order granted to Bradford Corporation in respect of their railless trolley vehicles and other matters. The Order will enable the Corporation to operate on routes outside the city and to increase their borrowing powers.

City and South London Railway Extension.—When the work of reconstruction on the City and South London Railway is completed the carrying capacity of this railway will be increased by 100 per cent. In order to cope with the heavy traffic which is anticipated, the companies have made provision in their new plans for equipping more than half the stations with escalators instead of lifts. Escalators will be installed at the Bank, Oxford Circus (C.L.R.), Tottenham Court Road and Shepherd's Bush stations.

U.S. Labour Troubles.—With the coal strike in its thirteenth week, and the accumulated stocks of coal rapidly disappearing, industry in the United States is now faced with the prospect of a railway strike, which threatens to dislocate railway transport throughout the country. A *Times* despatch says that the ultimatum sent to the railway managers on Wednesday stated that 400,000 men in the railway workshops would strike on Saturday unless a formidable series of demands was complied with.

Electrical Engineers in the War.—The Air Chief Marshal, Sir Hugh Trenchard, on Wednesday unveiled a bronze war memorial tablet at the Institution of Electrical Engineers, Savoy Place, W.C. Sir Hugh said that over 2,000 members of the Institution were on active service during the war, and 162 of these lost their lives. Nearly 500 war decorations were awarded. The service was conducted by the Dean of Westminster, and Mr. J. S. Highfield, president of the Institution, and Dr. W. H. Eccles, senior president of the Institution, took part in the ceremony.

London General Omnibus Company's Publicity.—The L.G.O.C. have issued an attractive series of pocket-size leaflets each dealing with the beauties and points of historic interest of such places as Sidcup, Farningham, Watford, Reigate, Dorking, St. Albans, Epping Forest, Virginia Water, Ascot, Hainault Forest, Farnborough, Leatherhead, Caterham, Godstone and the North Downs. Further leaflets are also in preparation dealing with other country omnibus routes, and the District Railway services. Other leaflets will set forth, for the guidance of country visitors, the sights and attractions of London.

Cardiff's New Omnibus Service.—Mr. R. L. Horsfield (general manager of Cardiff Corporation tramways) reported to the Committee on Monday that in connection with the taking over of the Whitchurch motor omnibus service it had been agreed to pay the Cardiff Tramways Co., the vendors, £6,000 for their land and buildings at Llandaff North. The Corporation are not taking over the company's vehicles, and the Tramways Committee decided to invite tenders for new omnibuses for this service. It was also decided to apply for sanction to borrow £6,120, with an additional £200, for certain fixtures and machinery at the company's depot.

Berlin Railway Disaster.—About 40 people were killed and many more were injured by an extraordinary disaster on one of Berlin's suburban railway lines on Tuesday. It has been a habit on occasions when traffic has been unusually heavy, for passengers who were unable to get inside the suburban trains to stand on the footboards outside and to hold on to a rail running along the coaches. On Tuesday, owing to a strike, other means of transport were unavailable, and the number of persons on the footboards was particularly large. One man carried on his back a bundle of boards, which caught passengers outside a train running in the opposite direction, with the result that over a hundred were torn from their places and thrown on to the line.

New Electricity Station at Barking.—Mr. A. Neal (Parliamentary Secretary to the Ministry of Transport) has written to Captain A. E. Martin, M.P., for the Romford Division, stating that the formal consent of the Electricity Commissioners to the establishment by the County of London Electric Supply Company of a generating station at Barking, designed to contain 100,000 k.w. of generating plant, and main transmission lines has been handed to the company. Barking forms part of the Romford Division, and the site selected is on the banks of the Thames. When introducing their scheme the promoters intimated that they proposed to spend over two million pounds in the first two years on the station, and approximately a million on cables.

Fire at Underground Power Station.—A serious fire occurred on Sunday evening at the sub-transmitting station of the Metropolitan Railway in Moor Lane, E.C. The power station is a two-floored building at the end of Moorgate Street Station platforms, and contains machinery, plant and a large switchboard of great value. At 6.30 p.m. a circuit-breaker blew out owing to an overload. This fault was remedied, and the circuit breaker restored, but no sooner had this been done than a shower of sparks came from the dynamo, followed by dense smoke. About 15 tanks of oil became involved, and a series of explosions followed. The thick smoke greatly hampered the efforts of the staff and many fire brigades to subdue the flames, and the building was practically destroyed. An immediate result of the outbreak was that the Metropolitan Railway trains were affected owing to the stoppage of the current, and some of them remained at a standstill in the tunnels.

PERSONAL.

Mr. H. Richardson, manager of Dundee Corporation electricity undertaking, has been appointed general manager of the Metropolitan Electric Supply Co., in succession to Mr. W. R. Rendell, who has resigned on account of ill-health.

Mr. J. M. McElroy.—The meeting of Manchester Corporation Tramways Committee on Tuesday was the last to be attended by Mr. J. M. McElroy, the general manager, who has been associated with the undertaking for 21 years, and who is about to retire. Alderman J. Bowes (chairman of the committee), took advantage of the occasion to refer in appreciative terms to Mr. McElroy's long and distinguished service. Incidentally, it may be recalled that it is exactly 21 years since the first tramway route was opened in Manchester.

CONTRACTS.

Karriers for Westminster.—The Highways Committee of the Westminster City Council recommends the purchase of five 3-4 ton chassis from Karrier Motors, Ltd., at £710 each, and the provision of bodies at £203 each, by the Eagle Engineering Co.

New Peking Tramways.—A Reuter's telegram states that the following tenders have been accepted for the supply of plant, machinery, rolling stock, etc., in connection with the new Peking tramways:—Boilers—Messrs. Babcock and Wilcox (109,000 gold dollars); Engines and generators—Brown, Boveri and Co. (109,000 gold dollars); Transformers—Siemens Co. (German) (24,000 gold dollars); Rails—French Company, through the Anglo-French Corporation (295,000 gold dollars); Cars—same tenderers (£55,000); Overhead equipment—Siemens Co.

FINANCIAL.

Maidstone Corporation Tramways.—The accounts for the year ended March 31 show a profit of £1,373, of which £321 represents a rebate on current used in a previous year.

Birmingham and Midland Motor Omnibus Co.—The net receipts for 1921 were £78,699, and £11,645 was brought forward, making £90,344. A sum of £25,000 is placed to reserve, and a dividend is declared on the ordinary shares of 10 per cent., plus a bonus of 5 per cent. The amount carried forward is £22,171.

Yorkshire (Woollen District) Electric Tramways.—The receipts for 1921 amounted to £124,331, as compared with £125,161 in the previous year. After deducting all charges, setting aside £15,000 to renewals fund, and adding £9,357 brought forward, there is an available balance of £18,238. A sum of £5,000 is transferred to reserve, and £13,238 is carried forward.

L.C.C. Traffic Receipts.—The traffic receipts for the week ended June 28 amounted to £94,217, a decrease of £11,198 compared with the corresponding period last year. The route length was 160.73 miles, as compared with 152.52 a year ago. From April 1 (the commencement of the financial year) to June 28 (12¼ weeks), the total receipts were £1,211,645, a decrease of £100,406 on the corresponding period of 1921.

Tramway Traffic Receipts.—Official returns of the principal tramway undertakings in the United Kingdom for the week ended June 17, give total receipts of £368,873, or £10,470 less than in the corresponding week of last year. The total length of track included in the returns was 1,948 miles. Receipts this year were at the rate of £189 7s. 2d. per mile of single track, and last year at the rate of £194 14s. 2d., thus showing a decrease for the week of £5 7s. 0d. per mile open.

Colchester Corporation Tramways.—In his annual report for the year ended March 31 last the general manager and engineer (Mr. R. C. Bullough) states that the total revenue was £21,216, a decrease of £3,711 on the previous year. The gross profit was £1,630, which was sufficient to pay interest on capital (£1,341) and £289 towards the £319 required for income tax. The deficit was £3,232, as compared with £2,474 last year. The mileage run was 304,717, a decrease of 22,919. The deficit is attributed to a combination of exceptional circumstances including the coal strike and the depleted military garrison.

Manchester Corporation Tramways.—The report of the Manchester Tramways Committee was presented to the Council on Tuesday and shows that the total revenue amounted to £1,994,576, while the working expenses were £1,519,838, leaving a balance of £474,738, or including bank interest (£2,966), £477,704. Out of this sum the following charges have been met:—Interest on capital, £91,991, redemption of debt, £87,600; street improvements, £7,269; rent of lines leased, £34,272, leaving a balance of £256,572. Of this amount £37,730 was required for income tax and the balance, £218,842, has been carried to the renewals fund. Energy consumption per car mile was 1.723 units and the price paid to the Corporation Electricity Department was 1.489d. per unit. The Corporation now has 801 cars. During the year 39 new cars have been put in service.

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The total length of track operated was 212 miles. The car miles aggregated 19,465,734 and 281,140,974 passengers were carried. The average total revenue per car mile was 24.5d. and the average working expenses per car mile including power cost 18.739d. The motor omnibuses earned £26,240, and the expenses were £25,512 The total receipts per bus mile were 21.966d. and the working expenses, including depreciation, 21.356d. The buses ran 286,708 miles and carried 2,271,201 passengers.

BUSINESS NOTES.

S.K.F. Transmission Equipment.—The Skefko Ball Bearing Co., of Luton, have issued a new catalogue of their transmission accessories. Artistically printed and well-illustrated, it will be found extremely useful to engineers in the erection or overhaul of their line shafting. Numerous tables are given setting out in detail the specifications of the various accessories supplied, so that every item of transmission equipment can be readily obtained. The manufacturers will be glad to send copies of the catalogue to firms interested.

Wanted.—Copies of THE TRAMWAY AND RAILWAY WORLD of January 19, February 16, and May 18, 1922.—Box 32, TRAMWAY AND RAILWAY WORLD Offices, 12 Norfolk Street, W.C.2.

THE
ENGLISH ELECTRIC
COMPANY, LIMITED.
Cars, Motors and Controllers
(DICK, KERR SYSTEM).
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TRAMWAYS AND OMNIBUS TRAFFIC RETURNS.

NAMES.	Week ended.	Latest Return. 1921.	1922.	+ or —	Aggregate. Wks.	1921-22.	+ or —
Aberdeen Corporation	June 21	3,520	3,685	+ 165	3½	11,375	+ 1,446
" Motor Buses	" 21	270	269	— 1	3½	761	— 357
Ayr Corporation ..	" 24	686	661	— 25	6	3,900	— 51
Barrow Corporation ..	" 24	886	565	— 321	12	7,507	— 3,180
Belfast City	" 23	13,495	11,652	— 1,843	12	142,451	— 14,062
Birkenhead Corporation	" 25	2,529	2,238	— 291	12¾	30,765	+ 160
" Motor Buses	" 25	820	705	— 115	12¾	9,148	+ 496
Birmingham Corporat'n	" 17	28,932	28,171	— 761	11	322,122	— 13,615
" Motor Buses	" 17	2,212	1,897	— 315	11	21,451	— 3,466
Blackburn Corporation	" 21	2,261	2,316	+ 55	12¼	31,724	+ 6,157
Bradford Corporation	" 17	11,458	14,827	+ 3,369	12	162,294	+ 16,253
Burnley Corporation ..	" 24	2,878	3,200	+ 322	..	..	..
Burton-on-Trent Corp.	" 25	593	547	— 46	12	6,834	— 728
Bury Corporation ..	" 25	2,429	2,289	— 140	12¾	31,248	+ 1,456
Chatham & District ..	" 15	1,527	1,784	+ 257	24	37,970	— 863
Chesterfield Corporatn.	" 19	1,298	1,147	— 151	11	14,439	— 1,152
Derby Corporation ..	" 24	1,675	2,064	+ 389	12	26,428	+ 2,093
Dundee City	" 21	3,501	3,081	— 420	5¾	16,671	— 1,717
East Ham Corporation	" 24	2,095	2,124	+ 29	12¼	26,587	+ 957
Edinburgh Corp. Trys.	" 17	14,020	12,353	— 1,667	5	63,043	— 4,298
" Motor Buses	" 17	4,220	3,830	— 390	5	18,996	— 2,350
Glasgow Corporation ..	" 24	48,576	43,567	— 5,009	3¾	157,591	— 12,806
Glossop (U.E. Sup. Co.)	" 24	213	210	— 3	25	5,686	— 143
Halifax Corporation ..	" 20	4,095	4,235	+ 140	11½	52,322	+ 4,740
" Motor Buses ..	" 20	101	88	— 13	11½	768	— 475
" Railless Cars ..	" 20	..	33	..	11½	679	..
Huddersfield Corp. ..	" 24	5,463	5,204	— 259	13	70,817	— 2,119
Ilford U.D. Council ..	" 24	1,662	1,508	— 154	12¼	18,590	— 325
Ipswich Corporation ..	" 24	804	845	+ 41	12	10,206	+ 676
Isle of Thanet	" 21	1,514	1,617	+ 103	37½	27,735	+ 1,432
Kilmarnock Corporatn.	" 24	357	334	— 23	5½	1,915	— 266
Leicester Corporation..	" 24	6,612	7,294	+ 682	25	184,086	+ 34,945
Liverpool Corporation	" 24	29,566	28,857	— 709	25	731,123	+ 39,195
London County Council	" 28	105,415	94,217	— 11,198	12½	1,211,645	— 100,406
Maidstone Corporation	" 22	424	472	+ 48	11½	5,941	+ 257
Manchester Corporation	" 24	39,495	33,914	— 5,581	12	443,013	— 41,727
Newcastle-on-T. Corp.	" 17	10,903	10,000	— 903	11	112,314	— 8,194
Nottingham Corp. ..	" 22	5,412	7,539	+ 2,127	12	92,619	+ 28,709
Oldham Corporation ..	" 28	4,692	4,300	— 392	13	61,772	— 1,796
Preston Corporation ..	" 21	1,812	1,706	— 106	11½	21,396	— 1,031
" Motor Buses ..	" 21	..	120	..	11½	1,517	..
Reading Corporation ..	" 22	1,610	1,547	— 63	12	18,833	+ 669
" Motor Buses ..	" 22	360	367	+ 7	12	4,193	+ 62
Rotherham Corporation	" 19	1,993	2,000	+ 7	11	23,914	+ 1,142
Salford Corporation ..	" 25	11,356	9,100	— 2,256	12¾	130,940	— 6,667
Sheffield Corporation ..	" 25	19,835	17,497	— 2,338	12¾	226,505	— 11,700
Southampton Corp. ..	" 21	2,606	3,252	+ 646	12	37,348	+ 6,990
" Motor Buses	" 21	284	100	— 184	12	1,175	— 2,370
Southend-on-Sea Corp.	" 21	2,369	2,872	+ 503	12	29,500	+ 7,505
South Shields Corp. ..	" 17	1,587	1,733	+ 146	11	19,466	+ 2,247
St. Helens Corporation	" 26	1,873	1,467	— 406	12	18,883	— 1,975
Sunderland Corporation	" 25	2,804	2,585	— 219	12	31,402	+ 1,008
Swindon Corporation ..	" 21	441	345	— 96	11½	4,323	— 428
Tyneside Trys., Trds...	" 14	1,147	886	— 261	24	20,016	— 8,844
Wallasey Corp. ..	" 24	2,787	2,529	— 258	12¼	32,278	— 1,048
" Motor Buses ..	" 24	244	215	— 29	12¼	2,979	+ 29
Walsall Corporation ..	" 24	1,591	1,448	— 143	12	19,639	— 684
" Motor Buses ..	" 24	804	652	— 152	12	10,736	— 193
Walthamstow U.D.C...	" 24	2,356	1,908	— 448	12¼	24,475	— 2,649
Warrington Corp. ..	" 22	946	894	— 52	12	11,611	+ 226
West Ham Corp. ..	" 22	5,780	5,445	— 335	11¾	68,941	+ 56
Wolverhampton Corp.	" 21	2,170	1,903	— 267	12	26,228	— 1,023
" Motor Buses	" 21	592	587	— 5	12	7,901	+ 434

FOREIGN AND COLONIAL TRAMWAY TRAFFIC RETURNS.

NAME.	Week or M'th.	Latest Return. 1921.	1922.	Wks.	Aggregate. 1921-22.	In. or Dec.
Anglo-Argentine ..	June 24	£74,858	79,907	25	£2,092,457	+ 85,346
Ballarat & Ben. (4 wks.)	April 23	5,121	5,473	4	5,473	+ 352
Brazilian Traction (Mlrs)	May	14,462,000	16,093,000	21	76,249,000	+10,307,000
Brisbane	April	47,750	48,700	17	192,590	+ 9,055
British Columbia $	May	826,039	827,701	48	9,417,543	+ 124,190
Buenos Aires Lacroze ..	May	58,492	59,278	48	638,716	+ 9,272
Burmah Tr. & Lght. Rs.	May	48,353	65,357	43	587,411	+ 80,800
Calcutta .. Rs.	June 24	86,467	98,712	25	2,650,255	+ 817,865
Cape Town	May	27,407	28,006	..	..	..
Carthagena & Herrerias	May	1,602	2,793	21	13,777	+ 904
Cordoba	Mar.	21,717	25,382	52	277,368	+ 39,922
East India	May	4,392	3,960	43	41,042	— 1,337
Kalgoorlie ..	Mar.	2,485	2,390	13	6,601	+ 1,652
La Plata ..	Mar.	* 3,403	7,067	13	20,109	+ 9,471
Madras (2 weeks) Rs.	June 15	* 47,759	47,439	23	540,679	+ 146,625
Manila .. .. $	April	279,534	286,044	17	1,189,893	— 15,816
Montevideo	May	46,579	48,074	30	327,493	— 5,963
Para	May	22,705	23,651	26	136,158	— 54
Pernambuco	June 25	3,060	3,156	25½	87,552	— 16,839
Port Elizabeth	May	6,304	6,713	..	..	..
Rangoon .. Rs.	May	138,950	145,450	21	703,758	+ 38,248
Shanghai .. $	May	166,080	188,546	21	908,763	+ 116,934
Singapore .. $	June 3	11,404	11,744	22	310,728	+ 40,171
Winnipeg .. $	May	433,836	427,880	22	2,299,272	— 58,504

* Strike of employees.

OTHER TRAFFIC RETURNS.

UNDERGROUND ELECTRIC RAILWAYS COMPANY OF LONDON, LTD.

COMMON FUND COMPANIES. Metropolitan District Rly. Co. .. London Electric Rly. Co. .. .. City & South London Rly. Co. .. Central London Rly. Co. .. .. London General Omnibus Co., Ltd.	Week ending June 24, 1922 ..	£240,116
	Corresponding week last year ..	247,854
	Decrease	7,738
	Aggregate from Jan. 1 to date ..	5,597,658
	Corresponding period last year ..	5,913,359
	Decrease	315,701
LONDON & SUBURBAN TRACTION GROUP Metropolitan Elec. Tramways, Ltd. London United Tramways, Ltd. South Met. Elec. Tr. & Ltg. Co., Ltd. Tramways (M.E.T.) Omnibus Co., Ltd	Week ending June 24, 1922 ..	£52,901
	Corresponding week last year ..	60,355
	Decrease	7,454
	Aggregate from Jan. 1 to date ..	1,223,525
	Corresponding period last year ..	1,334,169
	Decrease	110,644

METROPOLITAN RAILWAY	Passenger.	Goods.	Total.
Week ending June 24, 1922 ...	£33,649	£3,169	£36,818
Total Receipts (25 weeks) ...	824,514	91,450	915,964
MERSEY RAILWAY			
Week ending June 24, 1922 ..	—	—	£3,969
Total Receipts (25 weeks) ..	—	—	112,903

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THE TRAMWAY AND RAILWAY WORLD.
(REGISTERED AS A NEWSPAPER.)
FOUNDED. 1892.

PRICE ONE SHILLING

JANUARY 7, 1922
Vol. LI, No. 1.

Offices: AMBERLEY HOUSE, NORFOLK STREET, LONDON, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON.
Telephone No.: GERRARD 2948.

The Tramway and Railway World

ILLUSTRATED

A REVIEW OF PROGRESS IN Electric AND OTHER Traction.

The HICKMAN BODY BUILDING CO., Ltd.

SEATING 64 PASSENGERS.

Omnibus Body Specialists
and Commercial
Motor Body Builders.

OMNIBUS BODY DESIGNS REGISTERED.
CONSTRUCTION PROTECTED BY LETTERS PATENT.

SEATING 36 PASSENGERS.

:: 8, GROVE ROAD, HIGH ROAD, BALHAM, S.W. ::

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

TENDERS INVITED.

COUNTY BOROUGH OF SOUTHAMPTON.

Tramway Uniforms.

The Corporation invite tenders for the supply of Uniforms for the employees of the Tramways Department.

Form of tender may be obtained and samples inspected at the General Manager's Office, 161, Above Bar Street, Southampton.

Sealed tenders on the printed form, endorsed "Tender for Tramway Uniforms," must be delivered at the Town Clerk's Office, Municipal Offices, Southampton, on or before the 21st instant.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE,
Town Clerk.

January 4, 1922.

COUNTY BOROUGH OF SOUTHAMPTON.

Tramway Tickets and Punches.

The Corporation invite tenders for the supply of Tickets and for the hire of Ticket Punches, alternatively for periods of one and three years.

Form of tender may be obtained from Mr. J. Dobson, General Manager and Engineer, Tramways Offices, 161, Above Bar Street, Southampton.

Sealed tenders on the printed form endorsed "Tender for Tickets" or "Tender for Hire of Ticket Punches," must be delivered at the Town Clerk's Office, Municipal Offices, Southampton, on or before the 21st instant.

No pledge is given to accept the lowest or any tender.

R. R. LINTHORNE,
Town Clerk.

January 4, 1922.

COUNTY BOROUGH OF WEST HAM.

Tenders for Supplies, Etc.

The Council hereby invite Tenders for Uniform Clothing for :—
(a) Tramways Department.
(b) Fire Brigade and General Uniforms.

Forms of Tender and further particulars may be obtained, and Standard Samples seen, with respect to (a) at the Tramway Offices, Greengate Street, Plaistow, E.13; and with respect to (b) at the Borough Engineer's Office, Town Hall, West Ham, E.15, between the hours of 10 a.m. and 4 p.m. (Saturdays excepted).

A deposit of £1 will be required in respect of each form of Tender, which will be returned on receipt of a *bona fide* Tender.

NOTE.—No Tender will be considered unless the same is delivered at the Office of the Town Clerk, Town Hall, West Ham, E.15, in the envelope supplied, by Registered Post, not later than 12 o'clock noon on Friday, January 27, 1922.

The Council do not bind themselves to accept the lowest or any Tender. The Contractor will be required to enter into a bond, with sureties, for the due performance of the contract, and no goods, materials, etc., will be ordered under the contract until such bond has been duly executed.

The contractor whose Tender is accepted, and with whom a contract is entered into, will be required to pay to the whole of his workmen such rate of wages, and observe such hours of labour, as are recognised by the Workmen's Trade Unions, and in force at the time of signing the contract. In the event of any breach of such agreement the Council will enforce the penalty clause in its entirety.

By Order of the Council,
GEO. E. HILLEARY,
Town Clerk.

Town Hall, West Ham. E.15.
January 6, 1922.

Electric Tramcar Handbook
FOR
MOTORMEN, INSPECTORS, AND DEPOT WORKERS.
By W. A. AGNEW.
20 Pages, 7 ins. by 4½ ins. Cloth. Price, 3s. 6d. Postage, 4d.
Copies can be obtained from THE TRAMWAY AND RAILWAY WORLD Offices, Amberley House, Norfolk Street, W.C.

CITY OF SHEFFIELD.

Platelaying Material.

The Tramways Committee invite Tenders for the supply of :—
Points, Crossings, Fishplates, Tiebars, Copper Bonds.

Copies of Specification and Form of Tender may be obtained from the undersigned on and after Tuesday, January 3, 1922, upon payment of a deposit of £1 1s., which will be returned upon receipt of a *bona fide* Tender.

Tenders, sealed and endorsed "Tender for Platelaying Material," must be delivered not later than Saturday, January 21, 1922.

The Committee does not bind itself to accept the lowest or any Tender, and reserves the right to accept any Tender in part or in whole.

W. J. HADFIELD,
City Surveyor.

Town Hall, Sheffield.
December 31, 1921.

The Contracts will comprise the Fair Wages and Conditions of Labour Clause which has been adopted by the Sheffield Corporation, particulars of which will appear in the Conditions of Contract.

PORTSMOUTH CORPORATION TRAMWAYS.

Contract.

The Tramways Committee invite Tenders for the supply and delivery of :—
Uniform Clothing for Motormen, Conductors and Point Boys.
Uniform Cloth Caps for Motormen, Conductors and Point Boys.

Specification and Conditions, and Form of Tender may be obtained and samples may be seen, on application to the General Manager, Town Hall, Portsmouth.

The Form of Tender must include a declaration that the person or firm making the Tender, pays, and will continue to pay, not less than the rates of wages and observes, and will continue to observe, the hours of labour and conditions contained in the Fair Wages Clause adopted by the Corporation of Portsmouth (a copy of which is annexed to the Form of Tender).

Sealed Tenders, endorsed "Tenders for Uniforms, etc.," to be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 12 (noon) on Monday, February 6, 1922.

The Committee do not undertake to accept the lowest or any Tender, and reserve the right to accept the whole or any portion of any Tender.

W. R. SPAVEN,
General Manager.

Town Hall, Portsmouth.
January, 1922.

1837— —1922
TRADE MARK

THE men who make Henley Cables and Wires are all expert in the work they do. Each is a specialist in his branch. All have been with us many years.

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CABLES
"The perfect path from power to production."

HENLEY
Cables & Wires
are well made by only first class workmen.

W. T. Henley's Telegraph Works Co Ltd
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Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of "The Tramway and Railway World."

Name of Company or Firm.	Address.	Telegraphic Address.	Telephone No.
Allen & Co., Ltd., Edgar	Imperial Steel Works, Tinsley, Sheffield	Allen, Sheffield	Attercliffe 360 (6 lines).
Allen & Co., Ltd., Edgar (Tramway Dept.)	Imperial Steel Works, Tinsley, Sheffield	Askham, Sheffield (Tramway and Machinery)	Attercliffe 360 (6 lines).
Allen-Liversidge, Ltd.	268-270, South Lambeth Rd., London, S.W.8	Endazzle, Phone, London	Brixton 2171.
Allied Steel Makers & Founders, Ltd.	Central House, Kingsway, London, W.C.2	Steelite, Westcent, London	Regent 2368.
Alloy Welding Processes, Ltd.	P. & O. House, 14-16, Cockspur St., S.W.1	Alweprol, Westrand, London	Gerrard 3930, 3931, 3932.
Armstrong, Stevens & Son, Ltd.	Whittall Street, Birmingham	Armstrongs, Birmingham	Birmingham 6148.
Associated Equipment Co.	Blackhorse Lane, Walthamstow, E.17	Vangastow, Waltstreet, London	Walthamstow 780 (8 lines
Attwater & Sons	Hopwood Street Mill, Preston	Attwaters, Preston	Preston 1045 (2 lines).
Auto-Ticket Printing Co., Ltd.	Laird Street, Birkenhead	Extension, Birkenhead	Birkenhead 1453.
Avon India Rubber Co., Ltd.	Melksham, Wilts	Rubber, Melksham	Melksham 2.
Baker & Co. (Rotherham), Ltd., J.	Brinsworth Works, Rotherham	Brinsworth, Rotherham	Rotherham 89 and 435.
Bartle & Co., Ltd., Jas.	Lancaster Road, Notting Hill, W.11.	Bartle, 2605 Park, London	Park 2605.
Bates, Ltd., W. & A.	St. Mary's Mills, Leicester	Setab, Leicester	Central, Leicester 3789.
Bayliss, Jones & Bayliss, Ltd.	Victoria Wks., Monmore Green, Wolverham.	Bayliss, Wolverhampton	Wolverhampton 1041.
Beckett, Laycock & Watkinson, Ltd.	Acton Lane, Harlesden, London, N.W.10	Beclawat, Harles, London	Willesden 2408.
Bell Punch & Printing Co., Ltd.	52-58, Tabernacle Street, London, E.C.2	Belpunch, Finsquare, London	Central 7531.
Benjamin Electric, Ltd.	Brantwood Works, Tottenham, London, N.17	Benjalect, Tottlane, London	Tottenham 2114-5-6.
Bennis & Co., Ltd.	Little Hulton, Bolton	Bennis, Little Hulton	Farnworth 13.
Birch Brothers, Ltd.	Cathcart Street, London, N.W.5	—	Hampstead 6097.
Brecknell, Munro & Rogers, Ltd.	Thrissell Street, Bristol	Brecknell, Bristol	Bristol 3137.
Bridgeport Brass Co.	Bridgeport, Conn., U.S.A.	—	—
Brill Co., J. G.	150, Southampton Row, London, W.C.1	Axles, London	Museum 5313.
Brimsdown Lead Co., Ltd.	Brimsdown, Middlesex	Hydration, Enfield	Waltham Cross 132.
Bristol Tramways & Carriage Co., Ltd.	Bristol	Automobile, Bristol	Bristol 4260.
British Aluminium Co., Ltd.	109, Queen Victoria Street, E.C.4.	Cryolite, Cent., London	City 2676.
British Griffin Chilled Iron & Steel Co., Ltd.,	Temple House, Tallis Street, London, E.C.4.	Treadwell, Fleet, London	Central 7519.
British Insulated & Helsby Cables, Ltd.	Prescot, Lancs.	Insulator, Prescot	Prescot 71.
British Reinforced Concrete Engineering Co.	1, Dickinson Street, Manchester	Brenforce, Manchester	City, Manchester, 843c.
British Thomson-Houston Co., Ltd.	Rugby	Asteroidal, Rugby	Rugby 286.
British Thomson-Houston Co., Ltd.	77, Upper Thames Street, London, E.C.4.	Mazdalux, Cannon, London	Central 10434 (5 lines).
Brockhouse & Co., Ltd.	Victoria Works, Hill Top, West Bromwich	Brockhouse, West Bromwich	West Bromwich 431.
Brown & Co., Ltd., John	Atlas Works, Sheffield	Atlas, Sheffield	Central, Sheffield 79.
Brown & Sons, Ltd. David	Park Works, Lockwood, Huddersfield	Gearing, Huddersfield	Huddersfield 1080.
Brown, Bayley's Steel Works, Ltd.	Sheffield	Bayley, Sheffield	Central, Sheffield 82-85
Brush Electrical Engineering Co., Ltd.	Falcon Works, Loughborough	Falcon, Loughborough	Loughborough 624.
Buckley, Saunders & Co., Ltd.	8, Princes Street, London, S.W.1	Apabucksan, Parl, London	Victoria 790.
Cammell Laird & Co., Ltd.	Savile Street, Sheffield	Cammell, Sheffield	Central, Sheffield 3800.
Carbic, Ltd.	51, Holborn Viaduct, London, E.C.1.	Carbicitis, Cent., London	Holborn 511.
Chamberlain & Hookham, Ltd.	Solar Works, Birmingham	Solar, Birmingham	Central, B'ham 2161.
Chloride Electrical Storage Co., Ltd.	Clifton Junction, near Manchester	Chloridic, Pendlebury	Central, Man. 1638.
Clough, Smith & Co., Ltd.	36, Victoria Street, London, S.W.1	Clufmit, Vic., London	Victoria 7937.
Coan, R. W.	219, Goswell Road, London, E.C.1	Krankases, Isling., London	Central 4879; City 3846.

(Continued on page iv.)

BC-8605

COAN'S

NEW SPECIAL "B" GRADE

CAST ALUMINIUM NUMBER PLATES

Selling at 15/- per pair

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PHONE-NUMBER PLATE DEPT CITY 2862

TRAMWAY SUPPLIES, Ltd.

Tramway Engineers,

OVERHEAD LINE MATERIALS AND SUPPLIES.

Sole Manufacturers of

TURNER'S PATENT AUTOMATIC POINT CONTROLLERS.

Telegrams: "Controller, Leeds." Telephone 68, Headingley.

GROVE MILLS, MEANWOOD, LEEDS.

London Office: 93, CANNON STREET, E.C.4.

Telephone: City 3014. Telegrams: "Tramsuplim, Cannon, London."

THE BRISTOL TRAMWAYS & CARRIAGE COMPANY, LTD.

MANUFACTURERS OF THE

"Bristol"

40 H.P. CHASSIS.

CATALOGUE ON REQUEST.

CHASSIS PRICE GREATLY REDUCED

Telegrams: "AUTOMOBILE, BRISTOL."

Offices and Works: BRISTOL.

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(*Continued from page iii.*)

Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of "The Tramway and Railway World."

Name of Company or Firm.	Address.	Telegraphic Address.	Telephone No.
Continental Railway & Tramway Supply Co.	29, Rue de la Pepiniere, 29, Brussels	Railtram, Brussels	Brussels 16495.
Courtenay, J. W., Ltd.	Amberley House, Norfolk Street, W.C.2	Tramigro, London	City 7630.
Daimler Co., Ltd.	Daimler Works, Coventry	Daimler, Coventry	Coventry 505.
Davis, W. Sansome	29, Newtown Row, Birmingham	—	Birmingham Cent. 6046
Dennis Bros., Ltd.	Woodbridge Works, Guildford	Dennis, Guildford	Guildford 575 (4 lines).
Diamond Fibre Co., Ltd.	High Road, South Tottenham, London, N.15	Dymofyber, London	Tottenham 2124.
Docker Brothers, Ltd.	4 & 6, Moor Lane, Moorgate St., London, E.C.2	Matured, London	London Wall 2775.
Dodson, Ltd., Christopher	Cobbold Road, Willesden, London, N.W.10	Ceedolim, Willroad, London	Willesden 1630 (2 lines).
Duff Manufacturing Co.	Ulster Chambers, Regent Street, London, W	Levajack Reg. London	Regent, 3460.
Dunlop Rubber Co., Ltd.	Manor Mills, Aston, Birmingham	Elastic, Birmingham	Birmingham, East 123.
Dyer & Young	Stansted, Essex	Commutator, Stansted	Stansted, National 3.
Edison Swan Electric Co., Ltd.	Ponders End, Middlesex	Ediswan, Enfield	Enfield 520.
Electrical Apparatus Export Corporation	408, Bank Chambers, High Holborn, W.C.1.	Linsysweld, Holb., London	Holborn 1913.
Electricars, Ltd.	47, Seymour Place, London, W.1	Elecars, Edge, London	Paddington 5125 (6 lines)
Electro-Mechanical Brake Co., Ltd.	Eagle Works, West Bromwich	Brakes, West Bromwich	West Bromwich 291.
English Electric Co., Ltd.	Queen's House, Kingsway, London, W.C.2	Enelectico, Westcent, London	Holborn 830 (10 lines).
English Electric & Siemens Supplies, Ltd.	38 & 39, Upper Thames St., London, E.C.4.	Aetnaco, London	City 5350.
Equipment & Engineering Co.	Westinghouse Bldg., Norfolk St., London, W.C.	Kharparts, Estrand, London	City 1088 (2 lines).
Eyre Smelting Co., Ltd.	Tandem Wks., Merton Abbey, Lond., S.W.19	Analyzing, London	P.O. Wimbledon 604-5.
Fleming, Birkby & Goodall, Ltd.	Liversedge, Yorks.	Woodfield, Liversedge	Cleckheaton 103.
Fodens, Ltd.	Sandbach, Cheshire	Foden, Sandbach	Sandbach 45, 46 (2 lines)
Fraser & Chalmers Engineering Works	Erith, Kent	Vanner, Erith	Erith 168.
General Electric Co., Ltd.	Magnet House, Kingsway, London, W.C.2	Electricity, London	Regent 7050 (50 lines).
Glasgow Numerical Printing Co.	31, Finnieston Street, Glasgow	Tickets, Glasgow	Glasgow 5350.
Glenn, J. Barber	Moorgate Station Chambers, London, E.C.2	Octet, Ave., London	London Wall 262.
Goodrich Co., B. F., Ltd.	117-123, Golden Lane, London, E.C.1	Socketed, Barb, London	City 5344, 8550.
Green & Co. (Feltham), Ltd., Geo. W.	Q-Fel Works, Feltham	Cufel, Feltham	Feltham 14.
Grover & Co., Ltd.	Carpenters' Road, Stratford, London, E.15	Adopted, Strat., London	Stratford 984, 985.
Hadfields, Ltd.	East Hecla Works, Tinsley, Sheffield	Hadfield, Sheffield	Sheffield 750, 2628, 2638.
Halley's Industrial Motors, Ltd.	Yoker, Glasgow	Horseless, Glasgow	Clydebank 295 (4 lines).
Henley's Telegraph Works, Ltd., W. T.	13-14, Blomfield Street, London Wall, E.C.2	Henletel, Ave., London	London Wall 4560 (7 lines).
Henley's Tyre & Rubber Co., Ltd.	20-22, Christopher Street, London, E.C.2.	Hetewocol, Finsquare, London	London Wall, 3886 & 5394
Hickman Body Building Co., Ltd.	8, Grove Road, Balham, S.W.12.	—	Streatham 2481.
Hoffmann Manufacturing Co., Ltd.	Chelmsford	Hoffmann, Chelmsford	Chelmsford 151.
Hollings & Guest, Ltd.	Thimble Mill Lane, Birmingham	Plungers, Birmingham	Birmingham East 490.
Hurst, Nelson & Co., Ltd.	Motherwell, Scotland	Nelson, Motherwell	Motherwell 258.
Improved Wood Pavement Co., Ltd.	Blackfriars Ho., New Bridge St., London, E.C.	Imwoodment, Fleet, London	City 6533.
Johnson & Phillips, Ltd.	Charlton, London, S.E.7	Juno, Charlton, London, S.E.	Greenwich 400 (5 lines).
Kalker & Co., E.	Much Park Street, Coventry	Kalker, Coventry	Coventry 24X.
Karrier Motors, Ltd.	68, Victoria Street, London, S.W.1	Karriakar, London	Victoria 2246.
Kearsley & Co., Ltd., Robt.	Ripon, Yorks	Kearsley, Ripon	Ripon 5.
Kenyon, Alexander & Co., Ltd.	Victoria Bridge, Manchester	Everything, Manchester	City, Manchester, 2207.
Leyland Motors, Ltd.	Leyland, Lancs.	Leymotors, Leyland	Leyland 37 (3 lines).
London General Omnibus Co., Ltd.	Electric Railway House, London, S.W.1	C-O Underneath Vic. London	Victoria 6800.
Lorain Steel Company	36-38, New Broad Street, London, E.C.2	Steelmaker, London	London Wall 8186.
Manchester Armature Repair Co., Ltd.	Ford Lane, Pendleton, Manchester	Rewinding, Manchester	Pendleton 151.
Maudslay Motor Co., Ltd.	Parkside, Coventry	Maudslay, Coventry	Coventry 1115, & 110.
Metropolitan Vickers Electrical Co., Ltd.	Trafford Park, Manchester	Westinghouse, Manchester	Trafford Park 190 to 197
Midland Rubber Co., Ltd.	Ryland Street, Birmingham	Mirco, Birmingham	Midland 453.
Millars' Timber & Trading Co., Ltd.	Pinners' Hall, London, E.C.2	Jarrah, Stock, London	London Wall 368.
Motor Rail & Tramcar Co., Ltd.	Simplex Works, Bedford	Motral, Bedford	Bedford 110.
Municipal Tramways Association	5 & 6, Clements Inn, Strand, London, W.C.2	Munitrams, Phone, London	Holborn 1653.
North British Rubber Co., Ltd.	Castle Mills, Edinburgh	Weba, Edinburgh	Edinburgh, Central 3880
Pease & Partners, Ltd.	Tees Ironworks, Middlesbrough	Pease, Middlesbrough	Middlesbrough 917.
Peckham Truck & Engineering Co., Ltd.	26-29, Audrey Ho., Ely Place, Holborn, E.C.1	Truxenpeck, Ave., London	Holborn 4801.
Pinchin, Johnson & Co., Ltd.	General Bldgs., Aldwych, London, W.C.2	Pinchin, Phone, London	City 7180.
Plumpton, Ltd., Herbert	Liverpool Road, Warrington	Herbert Plumpton, Warrington	Warrington 586.
Rail Welding Co.	119, Victoria Street, London, S.W.1	Weltrajont, Sowest, London	Victoria 1363.
Railless, Ltd.	56, Moorgate Street, London, E.C.2	Skrailless, London	London Wall 9080.
Railway Supplies Co., Ltd.	68, Victoria Street, Westminster, S.W.1.	Forcato, Sowest, London	Victoria 4611.
Scholey & Co., Ltd.	Victory Works, Gloucester Road, Croydon	—	Croydon 2164.
Short Bros. (Rochester & Bedford), Ltd.	Whitehall House, 29-30, Charing Cross, S.W.1	Tested, Phone, London	Regent 378.
Shrewsbury & Challiner Tyre Co., Ltd.	Kay Street, Ardwick Green, Manchester	Challiner, Manchester	Manchester, Central 962.
Smith & Co., Frederick	Anaconda Works, Salford, Manchester	Anaconda, Manchester	Manchester 2334.
Standard Underground Cable Co.	Dock House, Billiter Street, London, E.C.3	Gramercy, London	Avenue 5463.
Stevens Petrol-Electric Vehicles, Ltd.	68, Victoria Street, London, S.W.1	Stemobile, Sowest, London	Victoria 1563.
Stewarts & Lloyds, Ltd.	41, Oswald Street, Glasgow	Lapweld, Glasgow	Glasgow, Central 6900.
Straker-Squire, Ltd.	Angel Road, Edmonton, London, N.18	Rhomboidal, Tottlane, London	Tottenham 2393.
Terry & Sons, Ltd., Herbert	Redditch	Springs, Redditch	Redditch 61 (5 lines).
Thermit, Ltd.	155, Church Rd., Battersea, London, S.W.11	Fulmen, Phone, London	Battersea 918.
Thornycroft & Co., Ltd., John I.	10, Grosvenor Place, London, S.W.1	Thornycroft, Vic., London	Victoria 8000.
Tilling-Stevens Motors, Ltd.	Victoria Works, Maidstone	Petelobus, Maidstone	Maidstone 117.
Titan Trackwork Co., Ltd.	Rutland Road, Sheffield	Crossings, Sheffield	Sheffield, Central 798.
Tramways & Light Railways Association	Caxton House, Westminster, London, S.W.1	Tralitrayl, Vic., London	Victoria 2110.
Tramway and Railway World	Amberley House, Norfolk Street, W.C.2	Tramigro, London	Gerrard 2948.
Tramway Supplies, Ltd.	Grove Mills, Meanwood, Leeds	Controller, Leeds	Headingley 68.
Tudor Accumulator Co., Ltd.	2, Norfolk Street, London, W.C.2	Subconical, Estrand, London	Central 3308.
Tyne Metal Co., Ltd.	Hexham-on-Tyne	Floating, Hexham	Hexham 189.
Underground Electric Railways Co.	Electric Railway House, London, S.W.1	Underneath, Vic., London	Victoria 6800.
Union Cable Co., Ltd.	Dagenham Dock, Essex	Cablewell, Dagenham	Rainham 25 (3 lines).
United States Steel Products Co.	36-38, New Broad Street, London, E.C.2	Steelmaker, London	London Wall 8186.
Western Electric Co., Ltd.	North Woolwich, E.16	Westophone, Phone, London	East 3840 (10 lines).
Westinghouse Brake & Saxby Signal Co., Ltd.	82, York Road, London, N.1.	Westinghouse, Kincross, London	North 2415 & 2416.
Williamson, Alfred	North Mill Printing Works, Ashton-u.-Lyne	Tickets, Ashton-under-Lyne	Ashton-under-Lyne 320.
Wiseman, Ltd., Alfred	Glover Street, Birmingham	Verus, Birmingham	Victoria, B'ham. 560, 561.
Woods-Gilbert Rail Remodelling Co., Ltd.	170, Strand, London, W.C.2	—	City 5147.
Yates, John & Co., Ltd.	70-71, Scholefield Street, Birmingham	Distribute, Birmingham	Birmingham E. 752, 753.

Printed for the Proprietors by Loxley Bros., Ltd., London, and Published at Amberley House, Norfolk Street, London, W.C.2.—January 7, 1922.
The Offices of THE TRAMWAY AND RAILWAY WORLD are at Amberley House, Norfolk Street, London, W.C.2.

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Continued from page iii.)

Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of "The Tramway and Railway World."

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Davis, W. Sansome	29, Newtown Row, Birmingham	—	Birmingham Cent. 6046
Dennis Bros., Ltd.	Woodbridge Works, Guildford	Dennis, Guildford	Guildford 575 (4 lines).
Docker Brothers, Ltd.	4 & 6, Moor Lane, Moorgate St., London, E.C.2	Matured, London	London Wall 2775.
Dodson, Ltd., Christopher	Cobbold Road, Willesden, London, N.W.10	Ceedolim, Willroad, London	Willesden 1630 (2 lines).
Duff Manufacturing Co.	Ulster Chambers, Regent Street, London, W.	Levajack Reg. London	Regent, 3460.
Dunlop Rubber Co., Ltd.	Manor Mills, Aston, Birmingham	Elastic, Birmingham	Birmingham, East 123.
Dyer & Young	Stansted, Essex	Commutator, Stansted	Stansted, National 3.
Edison Swan Electric Co., Ltd.	Ponders End, Middlesex	Ediswan, Enfield	Enfield 520.
Electricars, Ltd.	47, Seymour Place, London, W.1	Elecars, Edge, London	Paddington 5122 (6 lines).
Electro-Mechanical Brake Co., Ltd.	Eagle Works, West Bromwich	Brakes, West Bromwich	West Bromwich 291.
English Electric Co., Ltd.	Queen's House, Kingsway, London, W.C.2	Enelectico, Westcent, London	Holborn 830 (10 lines).
Equipment & Engineering Co.	Westinghouse Bldg., Norfolk St., London, W.C.	Kharparts, Estrand, London	City 1088 (2 lines).
Eyre Smelting Co., Ltd.	Tandem Wks., Merton Abbey, Lond., S.W.19	Analyzing, London	P.O. Wimbledon 604-5.
Ferodo, Ltd.	Sovereign Mills, Chapel-en-le-Frith	Friction, Chapel-en-le-Frith	Chapel-en-le-Frith 19 & 20.
Fleming, Birkby & Goodall, Ltd.	Liversedge, Yorks	Woodfield, Liversedge	Cleckheaton 103.
Fodens, Ltd.	Sandbach, Cheshire	Foden, Sandbach	Sandbach 45, 46 (2 lines).
Fraser & Chalmers Engineering Works	Erith, Kent	Vanner, Erith	Erith 168.
General Electric Co., Ltd.	Magnet House, Kingsway, London, W.C.2	Electricity, London	Regent 7050 (50 lines).
Glasgow Numerical Printing Co.	31, Finnieston Street, Glasgow	Tickets, Glasgow	Glasgow 5350.
Glenn, J. Barber	Moorgate Station Chambers, London, E.C.2	Octet, Ave., London	London Wall 262.
Grover & Co., Ltd.	Carpenters' Road, Stratford, London, E.15	Adopted, Strat., London	Stratford 984, 985.
Hadfields, Ltd.	East Hecla Works, Tinsley, Sheffield	Hadfield, Sheffield	Sheffield 750, 2628, 2638.
Halley's Industrial Motors, Ltd.	Yoker, Glasgow	Horseless, Glasgow	Clydebank 295 (4 lines).
Henley's Telegraph Works, Ltd., W. T.	13-14, Blomfield Street, London Wall, E.C.2	Henletel, Ave., London	London Wall 4560 (7 lines).
Henley's Tyre & Rubber Co., Ltd.	20-22, Christopher Street, London, E.C.2.	Hetewocol, Finsquare, London	London Wall, 3886 & 5394.
Hickman Body Building Co., Ltd.	8, Grove Road, Balham, S.W.12.	—	Streatham 2481.
Hoffmann Manufacturing Co., Ltd.	Chelmsford	Hoffmann, Chelmsford	Chelmsford 151.
Hollings & Guest, Ltd.	Thimble Mill Lane, Birmingham	Plungers, Birmingham	Birmingham East 490.
Hurst, Nelson & Co., Ltd.	Motherwell, Scotland	Nelson, Motherwell	Motherwell 258.
Improved Wood Pavement Co., Ltd.	Blackfriars Ho., New Bridge St., London, E.C.	Imwoodment, Fleet, London	City 6533.
Johnson & Phillips, Ltd.	Charlton, London, S.E.7	Juno, Charlton, London, S.E.	Greenwich 400 (5 lines)
Kalker & Co., E.	Much Park Street, Coventry	Kalker, Coventry	Coventry 24X.
Karrier Motors, Ltd.	68, Victoria Street, London, S.W.1	Karriakar, London	Victoria 2246.
Kearsley & Co., Ltd., Robt.	Ripon, Yorks	Kearsley, Ripon	Ripon 5.
Kenyon, Alexander & Co., Ltd.	Victoria Bridge, Manchester	Everything, Manchester	City, Manchester, 2207.
Leyland Motors, Ltd.	Leyland, Lancs.	Leymotors, Leyland	Leyland 37 (3 lines).
London General Omnibus Co., Ltd.	Electric Railway House, London, S.W.1	C-O Underneath Vic. London	Victoria 6800.
Lorain Steel Company	36-38, New Broad Street, London, E.C.2	Steelmaker, London	London Wall 8186.
Manchester Armature Repair Co., Ltd.	Ford Lane, Pendleton, Manchester	Rewinding, Manchester	Pendleton 151.
Massey Bros.	Enfield Street, Wigan	Massey, Builder, Wigan	Pemberton, 9.
Maudslay Motor Co., Ltd.	Parkside, Coventry	Maudslay, Coventry	Coventry 1115, & 110.
Menno Compressed Air Greasecup Co., Ltd.	Leeds Place, Tollington Park, N.4	Agreascup, London	North 1786.
Metropolitan-Vickers Electrical Co., Ltd.	Trafford Park, Manchester	Metrovick, Manchester	Trafford Park 190 (8 lines).
Millars' Timber & Trading Co., Ltd.	Pinners' Hall, London, E.C.2	Jarrah, Stock, London	London Wall 368.
Motor Rail & Tramcar Co., Ltd.	Simplex Works, Bedford	Motral, Bedford	Bedford 110.
Municipal Tramways Association	5 & 6, Clements Inn, Strand, London, W.C.2	Munitrams, Phone, London	Holborn 1653.
National Steel Foundry, Ltd.	Leven, Fife	Castings, Leven	Leven, 93.
Northern Ball Bearings, Ltd.	115, Gt. Portland Street, W.1.	Enorballer, Phone, London	Langham 1876.
Pease & Partners, Ltd.	Tees Ironworks, Middlesbrough	Pease, Middlesbrough	Middlesbrough 917.
Peckham Truck & Engineering Co., Ltd.	26-29, Audrey Ho., Ely Place, Holborn, E.C.1	Truxenpeck, Ave., London	Holborn 4801.
Pinchin, Johnson & Co., Ltd.	General Bldgs., Aldwych, London, W.C.2	Pinchin, Phone, London	City 7180.
Plumpton, Ltd., George	Albion Works, Warrington	Tools, Warrington	Warrington 572.
Premier Electric Welding Co., Ltd.	Abbey Wood, London, S.E.2.	Premelwel, Abwood, London	Woolwich 866.
Rail and Road Car Equipment Co.	205-207, City Road, E.C.1.	Ralandrode, Finsquare, London	Clerkenwell 4119.
Rail Welding Co.	119, Victoria Street, London, S.W.1	Weltrajont, Sowest, London	Victoria 1363.
Railless, Ltd.	56, Moorgate Street, London, E.C.2	Skrailless, London	London Wall 9080.
Scholey & Co., Ltd.	Victory Works, Gloucester Road, Croydon	—	Croydon 2164.
Short Bros. (Rochester & Bedford), Ltd.	Whitehall House, 29-30, Charing Cross, S.W.1	Tested, Phone, London	Regent 378.
Shrewsbury & Challiner Tyre Co., Ltd.	Kay Street, Ardwick Green, Manchester	Challiner, Manchester	Manchester, Central 962.
Skefko Ball Bearing Co., Ltd.	Luton	Skefko, Luton	Luton 418.
Slough Lorries & Components, Ltd.	Slough, Bucks.	Loricompts, Slough	Slough 240-4.
Smith & Co., Frederick	Anaconda Works, Salford, Manchester	Anaconda, Manchester	Manchester 2334.
Standard Underground Cable Co.	Dock House, Billiter Street, London, E.C.3	Gramercy, London	Avenue 5463.
Stevens Petrol-Electric Vehicles, Ltd.	68, Victoria Street, London, S.W.1	Stemobile, Sowest, London	Victoria 1563
Stewarts & Lloyds, Ltd.	41, Oswald Street, Glasgow	Lapweld, Glasgow	Glasgow, Central 6900.
Strachan & Brown	14, Leonard Place, Kensington, W.8.	Straubron, Phone, London	Western 1766-7.
Straker-Squire, Ltd.	Angel Road, Edmonton, London, N.18	Rhomboidal, Tottlane, London	Tottenham 2303.
Tearne & Sons, Ltd.	All Saints' Road, Birmingham	Tearne, Birmingham	Birmingham, Cent., 237.
Terry & Sons, Ltd., Herbert	Redditch	Springs, Redditch	Redditch 61 (5 lines).
Thermit, Ltd.	155, Church Rd., Battersea, London, S.W.11	Fulmen, Phone, London	Battersea 918.
Thornycroft & Co., Ltd., John I.	Thornycroft House, Smith Square, S.W.1	Thornycroft, Vic., London	Victoria 8000.
Tilling-Stevens Motors, Ltd.	Victoria Works, Maidstone	Petelobus, Maidstone	Maidstone 117.
Titan Trackwork Co., Ltd.	Rutland Road, Sheffield	Crossings, Sheffield	Sheffield, Central 798.
Tramways & Light Railways Association	Caxton House, Westminster, London, S.W.1	Tralitrayl, Vic., London	Victoria 2110.
Tramway and Railway World	Amberley House, Norfolk Street, W.C.2	Tramigro, London	Gerrard 2948.
Tramway Supplies, Ltd.	Grove Mills, Meanwood, Leeds	Controller, Leeds	Headingley 68.
Tudor Accumulator Co., Ltd.	2, Norfolk Street, London, W.C.2	Subconical, Estrand, London	Central 3308.
Tyne Metal Co., Ltd.	Hexham-on-Tyne	Floating, Hexham	Hexham 189.
Underground Electric Railways Co.	Electric Railway House, London, S.W.1	Underneath, Vic., London	Victoria 6800.
Union Cable Co., Ltd.	Dagenham Dock, Essex	Cablewell, Dagenham	Rainham 25 (3 lines).
United States Steel Products Co.	36-38, New Broad Street, London, E.C.2	Steelmaker, London	London Wall 8186.
West Bromwich Spring Co., Ltd.	George Street, West Bromwich	Helical, West Bromwich	West Bromwich 465-6.
Western Electric Co., Ltd.	North Woolwich, E.16	Westophone, Phone, London	East 3840 (10 lines).
Westinghouse Electric International Co.	2, Norfolk Street, W.C.2.	Wemcoexpo, London	Gerrard 3261.
Westinghouse Brake & Saxby Signal Co., Ltd.	82, York Road, London, N.1.	Westinghouse, Kincross, London	North 2415 & 2416.
Williamson, Alfred	North Mill Printing Works, Ashton-u.-Lyne	Tickets, Ashton-under-Lyne	Ashton-under-Lyne 320.
Wiseman, Ltd., Alfred	Glover Street, Birmingham	Verus, Birmingham	Victoria, B'ham. 560, 561.
Woods-Gilbert Rail Remodelling Co., Ltd.	170, Strand, London, W.C.2	—	City 5147.
Yates, John & Co., Ltd.	70-71, Scholefield Street, Birmingham	Distribute, Birmingham	Birmingham E. 752, 753.

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Telegraphic Addresses and Telephone Numbers

Of Advertisers whose Announcements appear in the Illustrated Issues of "The Tramway and Railway World."

Name of Company or Firm.	Address.	Telegraphic Address.	Telephone No.
Abbatt & Co., Wm.	Bridgman Street, Bolton	Abbatt, Bolton	Bolton, 313
Allen & Co., Ltd., Edgar	Imperial Steel Works, Tinsley, Sheffield	Allen, Sheffield	Attercliffe 360 (6 lines).
Allen & Co., Ltd., Edgar (Tramway Dept.)	Imperial Steel Works, Tinsley, Sheffield	Askham, Sheffield (Tramway and Machinery)	Attercliffe 360 (6 lines).
Allen-Liversidge, Ltd.	268-270, South Lambeth Rd., London, S.W.8	Endazzle, Phone, London	Brixton 2171.
Allsop, G. W.	Howard Street, Sheffield	—	Sheffield Central 707.
Armstrong, Stevens & Son, Ltd.	Whittall Street, Birmingham	Armstrongs, Birmingham	Birmingham 6148.
Associated Equipment Co.	Blackhorse Lane, Walthamstow, E.17	Vangastow, Waltstreet, London	Walthamstow 780 (8 lines.
Attwater & Sons	Hopwood Street Mill, Preston	Attwaters, Preston	Preston 1045 (2 lines).
Auto-Ticket Printing Co., Ltd.	Laird Street, Birkenhead	Extension, Birkenhead	Birkenhead 1453.
Avon India Rubber Co., Ltd.	Melksham, Wilts	Rubber, Melksham	Melksham 2.
Baker & Co. (Rotherham), Ltd., J.	Brinsworth Works, Rotherham	Brinsworth, Rotherham	Rotherham 89 and 435.
Bates, Ltd., W. & A.	St. Mary's Mills, Leicester	Setab, Leicester	Central, Leicester 3789.
Bayliss, Jones & Bayliss, Ltd.	Victoria Wks., Monmore Green, Wolverham.	Bayliss, Wolverhampton	Wolverhampton 1041.
Beckett, Laycock & Watkinson, Ltd.	Acton Lane, Harlesden, London, N.W.10	Beclawat, Harles, London	Willesden 2408.
Bell Punch & Printing Co., Ltd.	52-58, Tabernacle Street, London, E.C.2	Belpunch, Finsquare, London	Central 7531.
Birch Brothers, Ltd.	Cathcart Street, London, N.W.5	—	Hampstead 6097.
Brecknell, Munro & Rogers, Ltd.	Thrissell Street, Bristol	Brecknell, Bristol	Bristol 3137.
Bridgeport Brass Co.	Bridgeport, Conn., U.S.A.	—	—
Brill Co., J. G.	150, Southampton Row, London, W.C.1	Axles, London	Museum 5313.
Brimsdown Lead Co., Ltd.	Brimsdown, Middlesex	Hydration, Enfield	Waltham Cross 132.
Bristol Tramways & Carriage Co., Ltd.	Bristol	Automobile, Bristol	Bristol 4260.
British Aluminium Co., Ltd.	109, Queen Victoria Street, E.C.4.	Cryolite, Cent., London	City 2676.
British Griffin Chilled Iron & Steel Co., Ltd.,	Temple House, Tallis Street, London, E.C.4.	Treadwell, Fleet, London	Central 7519.
British Insulated & Helsby Cables, Ltd.	Prescot, Lancs.	Insulator, Prescot	Prescot 71.
British Mannesmann Tube Co., Ltd.	Salisbury House, London Wall, E.C.2.	Tubulous, Ave., London	Wall, 4610.
British Reinforced Concrete Engineering Co.	1, Dickinson Street, Manchester	Brenforce, Manchester	City, Manchester, 8430.
British Thomson-Houston Co., Ltd.	Rugby	Asteroidal, Rugby	Rugby 286.
British Thomson-Houston Co., Ltd.	77, Upper Thames Street, London, E.C.4.	Mazdalux, Cannon, London	Central 10434 (5 lines).
Brockhouse & Co., Ltd.	Victoria Works, Hill Top, West Bromwich	Brockhouse, West Bromwich	West Bromwich 431.
Brown & Co., Ltd., John	Atlas Works, Sheffield	Atlas, Sheffield	Central, Sheffield 29.
Brown & Sons, Ltd. David	Park Works, Lockwood, Huddersfield	Gearing, Huddersfield	Huddersfield 1080.
Brown, Bayley's Steel Works, Ltd.	Sheffield	Bayley, Sheffield	Central, Sheffield 82-85
Brush Electrical Engineering Co., Ltd.	Falcon Works, Loughborough	Falcon, Loughborough	Loughborough 624.
Buckley, Saunders & Co., Ltd.	8, Princes Street, London, S.W.1	Apabucksan, Parl, London	Victoria 790.
Cammell Laird & Co., Ltd.	Savile Street, Sheffield	Cammell, Sheffield	Central, Sheffield 3800.
Carbic, Ltd.	51, Holborn Viaduct, London, E.C.1.	Carbicitis, Cent., London	Holborn 511.
Chamberlain & Hookham, Ltd.	Solar Works, Birmingham	Solar, Birmingham	Central, B'ham 2161.
Clough, Smith & Co., Ltd.	36, Victoria Street, London, S.W.1	Clufmit, Vic., London	Victoria 7937.
Coan, R. W.	219, Goswell Road, London, E.C.1	Krankases, Isling., London	Central 4879; City 3846.
Continental Railway & Tramway Supply Co.	29, Rue de la Pepiniere, 29, Brussels	Railtram, Brussels	Brussels 16495.
Cook & Co., Samuel	Albert Works, Bury	Cook, Bury	Bury 30.
Courtenay, J. W., Ltd.	Amberley House, Norfolk Street, W.C.2	Tramigro, London	City 7630.
Daimler Co., Ltd.	Daimler Works, Coventry	Daimler, Coventry	Coventry 505.

(*Continued on page iv.*)

STEWARTS AND LLOYDS, Ltd.

HEAD OFFICES: 41, OSWALD STREET, GLASGOW; BROAD STREET CHAMBERS, BIRMINGHAM.
LONDON OFFICE: WINCHESTER HOUSE, OLD BROAD STREET, E.C.

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NOTICES.

All Communications and Advertisements for next week's issue should be received not later than noon on Friday.

Advertisements for the next issue, of which proof is desired should reach us by the second post on Wednesday.

The Editorial and Publishing Offices of "The Tramway and Railway World" are at Amberley House, Norfolk Street, London, W.C.2.

Telegrams: "TRAMIGRO, ESTRAND, LONDON."
Telephone: GERRARD 2948.

TENDERS INVITED.

STATE ELECTRICITY COMMISSION OF VICTORIA.

Tenders for Plant.

Tenders are hereby invited for the supply, delivery, etc., of the following for the Morwell Power Scheme.

Copies of Tender Form and Specification will be available upon application to:—AGENT GENERAL FOR VICTORIA, Melbourne Place, Strand, London, W.C.2.

SPECIFICATION No. 261.
STRAIN AND PIN TYPE INSULATORS.

CHARGE.—£2 2s. for the first three copies of Tender Form, Conditions of Contract, Specification and Drawing complete. These charges will be returned on receipt of a bona-fide tender. A fourth copy and any further copies will be supplied for the sum of 10s. 6d. each.

PRELIMINARY DEPOSIT.

A Preliminary Deposit of £100 is to be lodged with Tender.

The Specifications may be inspected at the above-mentioned office.

The Commission does not bind itself to accept the lowest or any tender.

Tenders on prescribed form, properly endorsed and addressed, must be delivered to the undersigned in Melbourne not later than noon, September 16, 1922.

R. LIDDELOW, Secretary,
State Electricity Commission of Victoria.

Melbourne, Victoria,
Australia.

EXETER CORPORATION TRAMWAYS.

The Tramways Committee invite Tenders for the supply and delivery of Uniform Clothing for Inspectors, Motormen and Conductors.

Tenders must be made on the official forms, which may be obtained from the Tramways Offices, Exeter.

Sealed Tenders endorsed "Tenders for Uniform" must be delivered to the Town Clerk, Exeter, not later than July 12, 1922.

The Committee do not undertake to accept the lowest or any Tender.

R. O. BALDWIN,
General Manager.

June 29, 1922.

FOR SALE.

COUNTY BOROUGH OF HALIFAX.

Tramways Department.

The Tramways and Electricity Committee of the Halifax Corporation have for Sale Six B.T.H., G.E. "58" Traction Motors complete, and One Spare Armature.

The motors have recently been overhauled, and are in thoroughly good condition, ready for installing. They can be viewed by application to the Tramways General Manager, Skircoat Depôt, Halifax.

Tenders, endorsed "Tramway Motors," should be delivered to the undersigned not later than July 8, 1922.

The highest or any Tender not necessarily accepted.

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PERCY SAUNDERS,
Town Clerk.

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Halifax.

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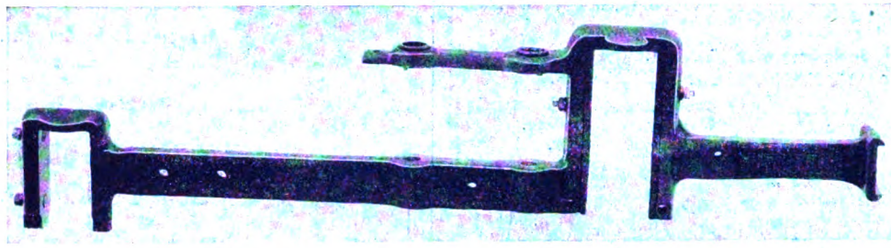

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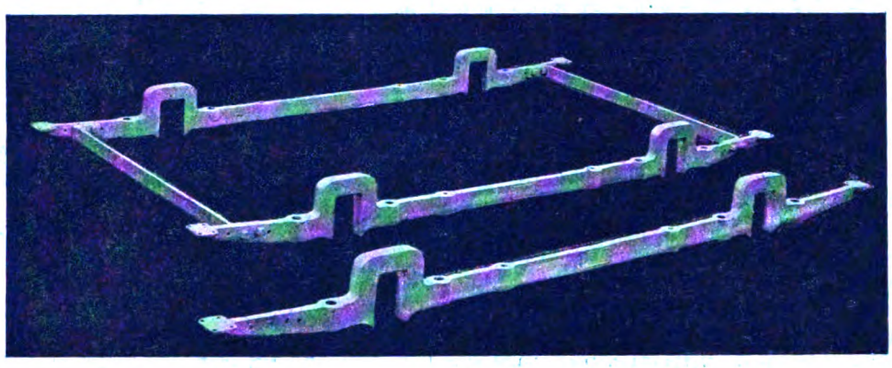

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